PACIFIC DISCOVERY

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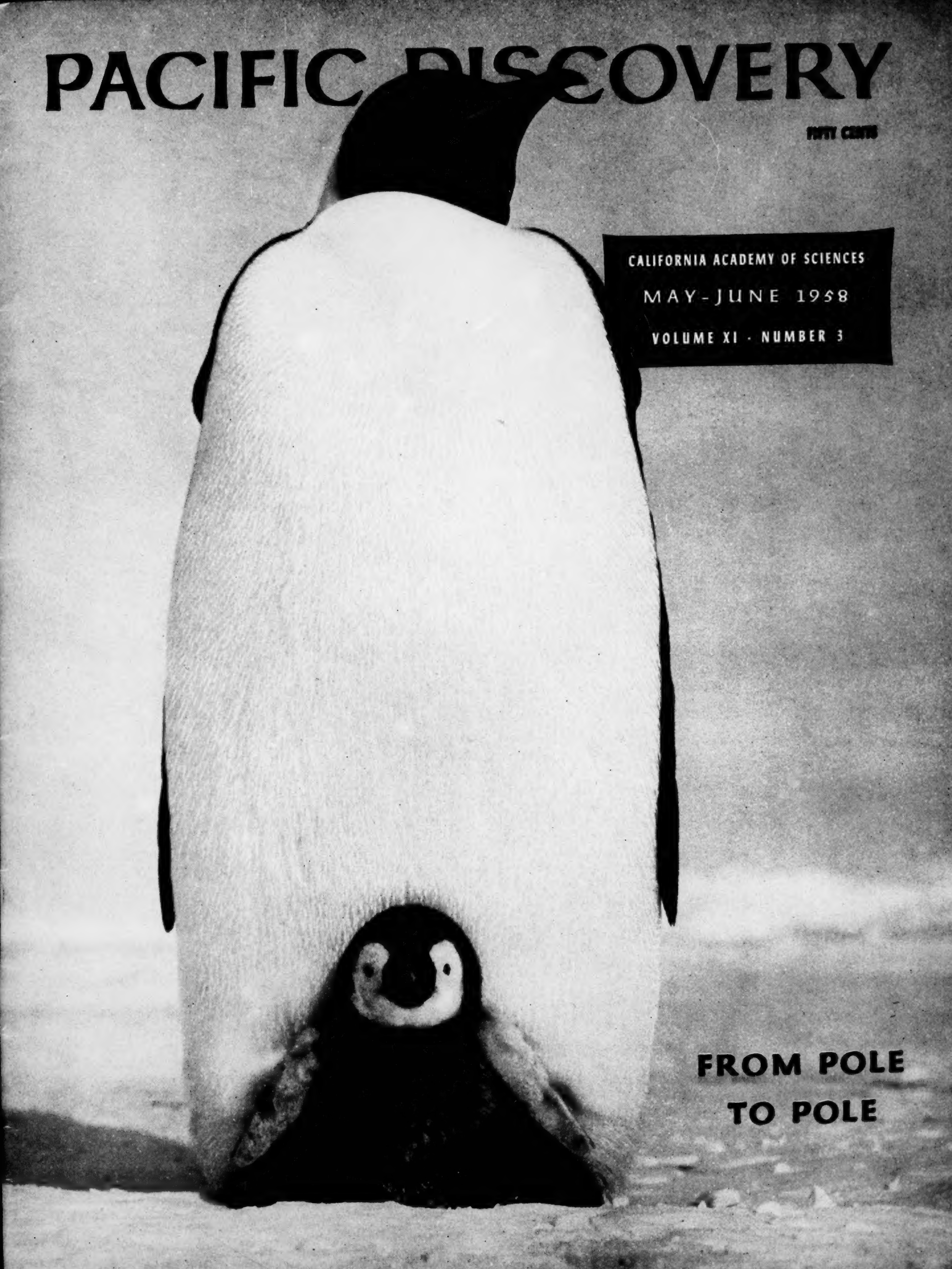

FROM POLE TO POLE

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PRE-DISCOVERY

THIS ISSUE MARKS the end of the temporary stewardship of Johan Kooy and Gary Barrett as Acting Art Director and Acting Editor, respectively, of *PD:* somewhat wistfully but gracefully they have returned to their regular jobs at the Academy. Returning to his post as Editor and Art Director — early in May — is Don Greame Kelley, who will, he indicates, be loaded with material and bristling with plans for future issues.

In the last six months, Kelley has traveled thousands of miles in the South Pacific, interviewing scientists and digging into scientific activities all over the area.

Before he returns to the States, Kelley will spend a couple of weeks in Hawaii collecting material for a forthcoming special issue on those islands. He also writes he has gathered copy and made arrangements for more material to be included in another special issue on Australia. In subsequent issues of *PD*, readers may expect a great deal of fascinating copy on the South Pacific.

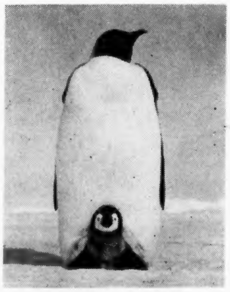
While Kelley was in Australia, he met and talked with C. F. Laseron, a member of the Australian Antarctic Expedition of 1911-1914, who had some pointed words to say about Antarctic exploration (see pages 14-15). It is fully expected his remarks will draw some equally pointed replies from Rear Admiral George J. Dufek and other American Antarctic explorers.

At, or at least near, the opposite pole, live the Eskimos of Alaska. The article on Eskimo whale hunting in this issue is one of a series of three which will appear in *PD*. The other two are on small game hunting and big game hunting by the Eskimos.

PD'S AUTHORS

IN EXPLORING, in this issue, some facets of both the Arctic and the Antarctic, we are happy to include the editorializing of **Dr. Ira L. Wiggins** on the International Geophysical Year in the Arctic. Dr. Wiggins, Associate Editor, knows whereof he writes, having been Director of the Arctic Research Laboratory at Point Barrow, Alaska, for several years. . . . ¶ Managing Editor **Robert C. Miller,** disproving the adage "everybody complains about the weather, but nobody does anything about it" did do something about it: he wrote the article on what's happened to our weather in this issue. . . . ¶ Two newcomers to *PD*, **George Wallerstein,** California Institute of Technology astronomer, and **Don Clarke,** a chemical engineer, collaborated on an account of a mountain-climbing trip in the austere and beautiful St. Elias Range in the Yukon and southeast Alaska. . . . ¶ **Dr. G. Dallas Hanna,** Curator of Geology at the Academy, was also — among his extensive and varied Alaskan field work — Director of the Arctic Research Laboratory. Mrs. Hanna accompanied Dr. Hanna on his most recent trip of a year's duration to Point Barrow and just a sampling of the many excellent photos they took of Arctic wildflowers appears in this issue. . . . ¶ **C. F. Laseron,** new to *PD*, is an Australian explorer and author and was a member of the Australian Antarctic Expedition of 1911-1914.. . . . ¶ **A. R. Franzke** photographed the midnight sun every four minutes for the photograph in this issue's center spread. **Marshall Schalk** made the print. (See page 15 for details.) . . . ¶ The Alaskan Eskimos never lose the instinct to hunt, a fact brought out by **Richard D. Taber** in this issue. Taber is a member of the faculty of the School of Forestry at Montana State University and appears in *PD* for the first time. . . . ¶ **J. McKim Malville** was formerly a member of the Academy's Student Section and more recently, a member of the scientific staff at an American IGY base in Antarctica. The first installment of Malville's account of the IGY activities at the base appeared in 1957 and the installment in this issue takes up where the previous article left off and continues until Malville finished his year-long tour of duty. . . . ¶ **George W. Bunton,** the Academy's Curator of Astronomy, conducts this issue's Astronomy section with a discussion of the role of astronomers in the IGY.

IN THIS ISSUE



THE COVER

ALTHOUGH this photograph of an adult Emperor penguin and its chick has appeared before, we felt the penguins' method of beating the Antarctic cold makes an unusually interesting subject. (Photo by the U. S. Navy. *See page 22.)*

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EDITORIAL The IGY in ARCTIC AMERICA

SPECTACULAR ACCOMPLISHMENTS in the Antarctic phase of the program of the Third International Geophysical Year have caught the attention of the press, but efforts of scientists stationed in the American Arctic have received relatively little notice. Yet the program of IGY is worldwide in scope and the governments of the United States and Canada have established stations in many parts of arctic Alaska, Canada and Greenland to obtain important data in those regions.

The men at our northern outposts often perform monotonous tasks, but their routine observations constitute an important part in the total IGY project, for the data they obtain often fills gaps in records running back to the day of the Franklin Expeditions and earlier. In more instances than one might expect, the more or less humdrum, tiresome accumulation of data through tedious observations is almost as important as the far more stimulating work done when the first ship or dog-team penetrates a previously unmapped area. Without the meticulous, critical checking and rechecking of certain readings and observations, too much uncertainty surrounds the early records to permit their fullest use.

In order to obtain statistically usable and technically reliable sets of data, arctic stations have been established in the American Arctic to record such things as the rate at which cosmic rays enter our atmosphere, changes in the geomagnetism of the earth, minute shifts in the diurnal tides along arctic coasts, cyclic deterioration in radio reception, pulsations in ionospheric activity, annual changes in the temperature at different depths in the earth, and other important characteristics of arctic phenomena. Some of the equipment utilized is semi-automatic. Other instruments need to be watched and serviced very frequently. Thus, some stations are manned 24 hours a day, others may be without a human attendant for several days at a stretch.

Both military and civilian personnel are involved in securing information necessary for us to gain the greatest return from the money, time, and energy invested in the IGY program. Most of the men expect to stay in the arctic only until current terms of enlistment or contracts expire. A few love the arctic and will be content to remain there the rest of their lives. Still fewer are Eskimo youths who have learned to perform exacting tasks and find tremendous satisfaction in their roles within the framework of the IGY program.

But whether an observer is a biophysicist trained in Austria and commands a party on the floating ice pack, an electronics expert from a government research agency, a meteorologist from New Jersey, a graduate student in geology isolated high in the Brooks Range, a Nisei oceanographer from southern California, or an Eskimo whose parents live in Point Barrow, Kotzebue or Aklavik, each of these men is proud of the fact that he is a member of an international team striving to add significantly to the sum total of mankind's knowledge about the earth on which we live.

Many of the scientists and technicians are fully aware that they are cooperating, not only with their contemporaries, but also with those who struggled in small wooden ships under sail to penetrate the arctic ice pack, to discover new shores and channels, to chart unknown polar seas and their broad, silent currents. They feel kinship with such explorers as Hudson, Parry, Davis, Ross, Nansen, Peary, Amundsen and scores of other intrepid souls.

Much of the information basic to the formulation of plans for IGY was collected by men long since dead. They knew little of the significance of some of the data they recorded. Nor should our governments insist upon or expect immediate application of all of the information obtained during the present Geophysical Year. We should aim toward continuation of the studies far beyond the time limits set for the Third International Geophysical Year. This can be done, even if not on the grand scale now being enjoyed. Our goal should be to build up an ever more reliable body of fact about the life and conditions in the American Arctic in anticipation of still distant programs as yet not even in the planning stage. Many of the IGY stations should be kept active, some perhaps for five years, others much longer. We have not yet, and will not, by the end of the IGY, have learned all of the important secrets the arctic holds. We, the people of the United States, should insist that continued financial and intellectual support be given to the scientists and their assistants who have participated in this international venture, and to those who will succeed them. They are willing and eager to devote additional years to gathering information about the American Arctic. They deserve our backing.

I.L.W.

What's Happened to Our

SAN FRANCISCO has an average annual rainfall of 20.51 inches. Already this year (as of April 6) it has had a seasonal total of 34.62 inches, with more pretty certain to come. Houses are sliding down hillsides, lowland residences are inundated, trains are stalled by snow in the Sierra. Soggy, groggy Californians are asking, with mingled irritation and bewilderment, "What's happened to our weather?"

Recently it has been reported that our rain is highly radioactive. It is easy to leap to the conclusion that there is some connection between atomic fallout and the unwonted (unwanted!) precipitation. But it is not necessary to conclude that this is the case. Coincidence of events does not prove causal connection. It would be just as logical to conclude that, since the heavy rainfall coincided with the crackdown on open burning by the Bay Area Air Pollution Control Board, the precipitation resulted from the lack of open fires.

There *is* a scientific explanation of how increased radioactivity *might* affect the weather, through increased ionization of the atmosphere, but there is no real proof that it has had any significant effect. An equally plausible hypothesis, of much longer standing, is that wet and dry cycles are related to sunspots, but this too remains unproven. The year 1957 was characterized by the greatest number of sunspots in this century; it also led into our extremely wet winter. But unfortunately for this seeming correlation, the preceding winter, which had less than average precipitation (compared to this year, it was dry), was also a period of unusually great sunspot activity.

Fortunately we are not limited to exercises in formal logic to show that there is no necessary connection between atomic fallout and our recent objectionable weather. A decade or so ago Charles Pennypacker Smith, meteorologist for the Pacific Gas and Electric Company, delved into early records of weather and climate as preserved in the library of the California Academy of Sciences and the Bancroft Library of the University of California. He came up with the answer that probably the worst winter of record in California was that of 1861-62, when the rainfall for the season totaled 49.27 inches, considerably more than twice the normal.

That winter was not only wet — it was cold. On nineteen days between January and March the temperature was below 33° F. On January 28, 1862, the temperature went down to 22° F., which is the coldest weather ever recorded in San Francisco. This is interesting, because from what we know of weather and climate on the Pacific coast we would expect a wet winter to be also a mild one.

The above records were from the data of Thomas Tennant, a watchmaker and repairer of chronometers and nautical instruments who set up in business in San Francisco in 1850. We have no way of checking his temperature records, except to say that he had maximum and minimum thermometers purchased in Philadelphia, doubtless the best available at that time. They were checked by the Signal Corps in the 1870's, and found ac-

The heavy rains of winter and early spring make the Sacramento Valley resemble an enormous rice paddy. The city of Colusa, pretty well water-soaked, can be seen in the center. (Photo courtesy the San Francisco Chronicle.)

r Weather?

Robert C. Miller

curate. We can check Tennant's rainfall figures in an indirect way.

The winter of 1861-62 was undoubtedly a very wet winter. The Central Valley was flooded from Marysville to Fresno. Fifty per cent of the population of Sacramento (then 15,000) had to be evacuated. There are newspaper reports that in the Sierra a bridge across the American River 90 feet above low water level was washed out, but the precise locality is not given. Anyway there is no doubt that it rained long and hard. And we certainly cannot attribute this to atomic fallout.

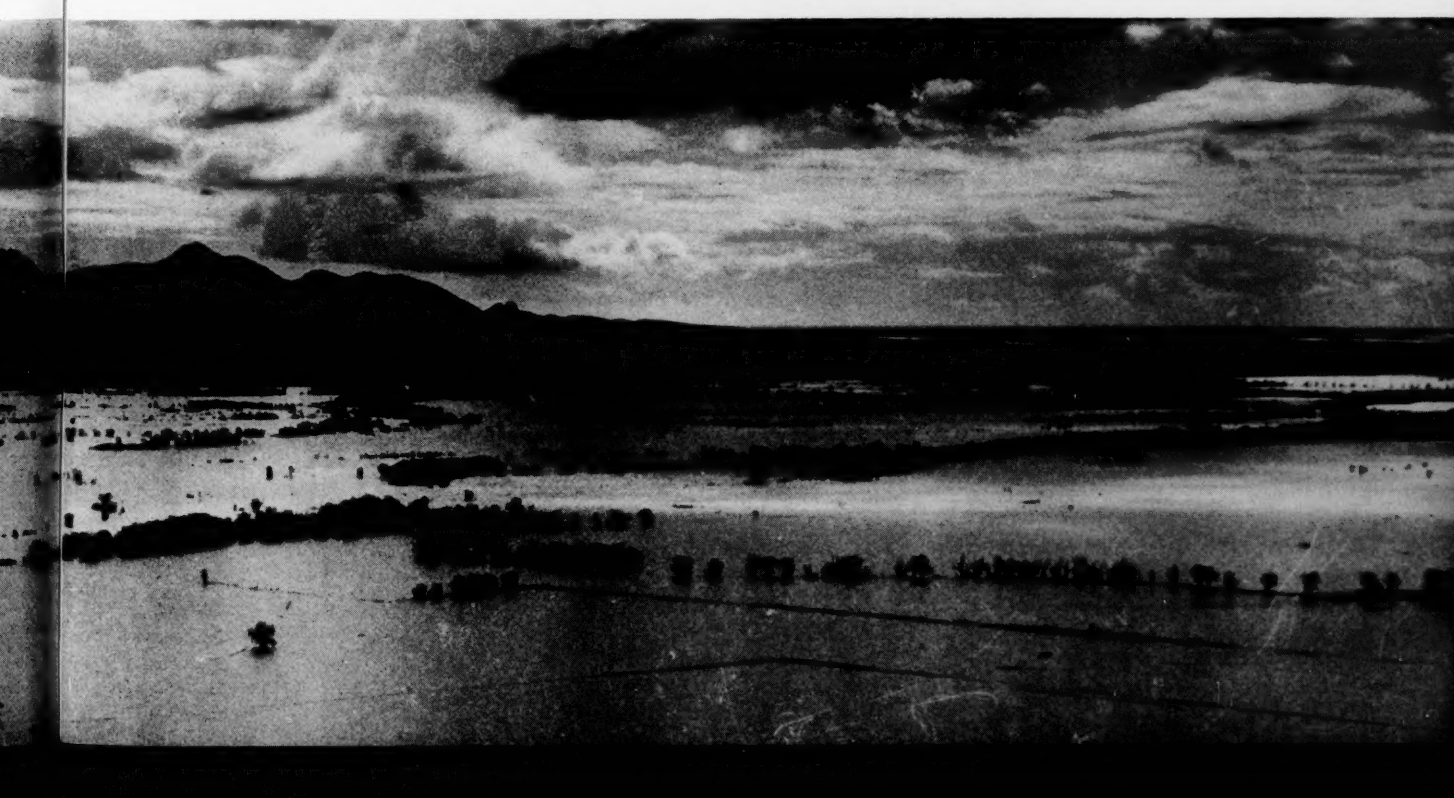
Now what can we say about our current weather? One thing is that the Pacific Ocean has been considerably warmer than usual. At the Scripps Institution of Oceanography at La Jolla, California, sea surface temperatures during July, August and September, 1957, reached the highest averages recorded in 26 years. This was not an isolated phenomenon. Data from the California Cooperative Oceanic Fisheries Investigations indicate that increased water temperatures (up to 3° C. above those of the period 1949-54) prevailed over most of the area off California and Baja California in 1957. On the western edge of the Pacific the tropical rainy season lasted almost six weeks longer than usual; Hawaii had its first recorded hurricane; and at Point Barrow, Alaska, the ice went out on July 1, the earliest time in history.

How does a warm ocean affect the weather? First of all, it increases the temperature of the air above it. A warm ocean and warm air increase the rate of evaporation, increase the amount of moisture the air is able to hold, and thus increase the amount of rain that air is able to deliver as it moves inland across the continent. Warm air at the lower levels further increases the turbulence of the atmosphere, and accelerates all the processes that cause our weather.

Californians drying out after the worst drenching in this century can comfort themselves with the thought that the same oceanic conditions that contribute to a rainy winter contribute also to a warm, fog-free summer. Remember the remarkably fine summer of 1957? If the ocean remains warm, we may anticipate a return engagement, thus helping us to forget the recent precipitation.

It is an interesting question why the wet winter of 1861-62 was a cold winter, while the wet winter of 1957-58 has been a warm one. Central California is a kind of sparring ground between the rainy climate of the north Pacific coast and the arid climate of southern California. Storms moving in from the Pacific may, for reasons only dimly understood, swing a few hundred miles north or a few hundred miles south of their anticipated course. That is why the weather in the San Francisco Bay Area is so hard to predict, and why you sometimes have to put on your raincoat to go out to get a paper telling you the weather is clear.

Perhaps the world-wide, coordinated investigations of the IGY will provide the answers to some of our puzzling weather problems — increasing the accuracy of forecasting and giving us the intellectual satisfaction of knowing *why* our weather behaves as it does.



Six mountaineers brave the frozen pinnacles of the

MOUNTAINS OF THE MIDNIGHT SUN

George Wallerstein & Don Clarke

AS WE WAVED goodbye to our bush pilot that Sunday, the 4th of August, it was hard to realize we had left Los Angeles only two days before. Now, 2,000 miles northwest from Los Angeles, 25 miles east of the Alaska-Yukon border, and only 200 miles south of the Arctic Circle, the six of us stood on the steep shore of a little moraine lake. The departing plane was our last contact with the outside. Even the nearest horse trail was 30 miles north through virgin bush. The northeast corner of the St. Elias Range is one of the least accessible areas in North America, and it is still not mapped.

Our trip was born from frustration. George Wallerstein had been a member of a Sierra Club trip to the Mt. Wood area in 1956. Bad weather defeated all their climbing attempts except for three 10,000 foot summits northeast of Mt. Wood. So, early in 1957, George started fishing with letters and phone calls. "How about a trip to the Yukon? Wonderful virgin peaks! It will take only four weeks." By the end of May, six of us had bitten and the trip was on.

We were a diverse crew. Bill Davis, Jim Sutherland, Barbara (Bobbie) Lilley, Bud Bingham, George Wallerstein, and Don Clarke: from Colorado, Virginia, California, New York, and Ontario, Canada: an experimental psychologist, a missiles engineer, a typist, a telephone technician, an astronomer, and a chemical engineer. However, we were interested in glacier study. And we were all active members of mountaineering clubs, trained to climb.

Before this trip, four of us were strangers to the Alaska-Yukon topography. The St. Elias Range is an excellent example of sub-arctic mountains. Mt. Logan, at 19,850 feet is the highest peak, and there are many peaks of 14-15,000 feet. The valleys are filled with glaciers. Above the snow line at about 3,000 feet on the southwest side, and 8,000 feet on the northeast side, the mountains are almost completely covered with snow and ice. A mountain wall as high as the St. Elias creates a great climate difference between the ocean side and the land side.

Both winter and summer storms deposit an enormous amount of precipitation on the ocean side. Here are to be found the largest glaciers of North America. An example is the Upper Seward

Left, glacial morains are a most common sight in the sub-arctic St. Elias Range. Above, the snow-and-ice-dusted St. Elias Range. The lofty peak in the top center is Mount St. Elias—18,008 feet high—and the Malaspina Glacier, formed by the flow of ice from the Upper Seward and several other glaciers, is on the left. (Photos by G. D. Hanna)

Glacier which covers an area of about 500 square miles. The ice of the Upper Seward and several other glaciers flows to the coastal plain and forms the Malaspina Glacier. The Malaspina is a large piedmont lobe of about 1,000 square miles of ice that almost reaches the ocean north of Yakutat, Alaska.

On the inland side of the range there is much less precipitation. The winters are colder and the summers are warmer and drier. The reputation for pleasant summers was one of the factors that attracted us to this side. However, there are enough high peaks to provide extensive areas for the accumulation of snow. This snow feeds down into large valley glaciers that flow northeastward out toward the plateau of the Yukon Territory.

Typical of these glaciers on the inland side of the range is the Klutlan Glacier, beside which we had landed. The accumulation area of the Klutlan Glacier is located mostly on the slopes of Mt. Bear (14,850 feet) and Mt. Bona (16,420 feet). Three major ice streams join at an altitude of about 7,000 feet to form the Klutlan which then flows for 40 miles through the mountains to end at about 3,500 feet amid the wooded hills of the Yukon Plateau.

The Brabazon Glacier is a small and complex branch of the Klutlan Glacier. It enters from the south, about 15 miles above the tongue of the Klutlan. Our base camp was to be located on the Brabazon, where three ice streams join to form a large flat – we called it Brabazon Plaza. Below base camp, the Brabazon winds down through the peaks for about 10 miles until it enters the Klutlan. Minor ice flows join enroute, including the Wood Glacier and an unnamed ice stream which together confine the northwest ridge of 15,880 foot Mt. Wood. Near the junction with the Klutlan, the Brabazon is completely covered with rocks and dirt.

By the time we had loaded eighteen cans of supplies into our chartered "Beaver," there was barely room for George to stand, straddling the drop hatch. George was taking this first flight from Kluane Lake as drop master. Behind us were about five months of preparation, including a hectic three weeks in June when we purchased our food, packed the air drop cans, and just beat the deadline for shipping them to Whitehorse. Bill Davis had arrived in Whitehorse two days before us to handle the customs, the RCMP checkout, and the transportation 175 miles up the exciting Alaska Highway to Burwash Landing.

Except for the food and basic equipment required for a three-day walk, all of our supplies were packed in orange 15-gallon grease drums and loaded in this first plane-load for the air drop. The two drums with the stove fuel were dropped with cargo parachutes. The rest George just slipped through the cargo hatch to fall free while the plane flew about 100 feet above the target area. The first four, containing food and the rubber raft, were spotted near the head of the Klutlan River. One drum was dropped into a 14,000 foot snowfield on the west side of Mt. Wood. All the rest were spread around our base camp area on the Brabazon Glacier. The bucking floor of the plane cabin proved a bit upsetting for George, and more than drums went out the cargo hatch.

A second plane trip brought us from Burwash Landing to join George at Little Teepee Lake.

Little Teepee Lake is about half a mile east of the tongue of the Klutlan Glacier. From there we followed the route established by the 1956 Sierra Club trip, 15 miles along benches above the Klutlan to the canyon where the Brabazon Glacier enters the Klutlan from the south. Most of this stretch was on game trails. We hung a cowbell on George's pack to avoid surprise encounters, but we still saw moose and caribou. Four Dall sheep cavorted on the cliffs above our lunch spot and a mother grizzly with two cubs was leaving one of the stream crossings as we arrived. Fortunately, she was headed away from our path. Our first camp after we landed was beyond the evergreen forest, and dead bushes provided our last real campfire for three weeks.

To save weight, we had air-dropped our tents, and were walking in with thin plastic tarps for rain protection. The protection was not adequate. Rain started the second evening and it continued to drizzle the following morning. We traveled up the canyon of the Brabazon Glacier to the foot of the northwest ridge of Mt. Wood, arriving at the location of the 1956 base camp late Tuesday afternoon. It was pouring. None of us will ever forget Shambles Camp that night, about a mile above 1956 base camp. In a driving rain, we chopped a platform on the ice, cooked and shivered under a plastic tarp, then crawled into damp sleeping bags, three people per tarp.

It is amazing what sunlight can do for morale. As we trudged up the Brabazon Glacier after

Top right, jagged peaks thrust out of an ice field in the St. Elias Range. (Photo by G. D. Hanna.) Middle, looking down on Anderson Glacier from Snowfield Peak (13,400 feet high), one of six peaks conquered for the first time by the authors and their fellow mountaineers. Bottom, the mountaineers' main camp on Brabazon Glacier. In the background, 13,800-foot Mount Fermi, another peak the mountaineers climbed. (Photos by the authors.)

our night at Shambles Camp, the wind shifted. By mid-afternoon, the sky cleared enough for patches of sunlight. We stopped immediately to dry clothes and bedding — and start the cameras snapping. Through scudding clouds we could catch glimpses of Mt. Wood and Mt. Craig, "Angeles Peak" loomed above us to the south, and the snow-capped summits of "The Gemini" were brilliant in the sunlight.* The storm's snow level was almost at our feet. Dry and recharged, we hurried on to reach our base camp about two hours later.

Brabazon Plaza is one of the most gorgeous spots imaginable. Except for the narrow valley down which the Brabazon flows, the surroundings consisted entirely of snowclad, unclimbed peaks of 11,000-14,000 feet elevation.

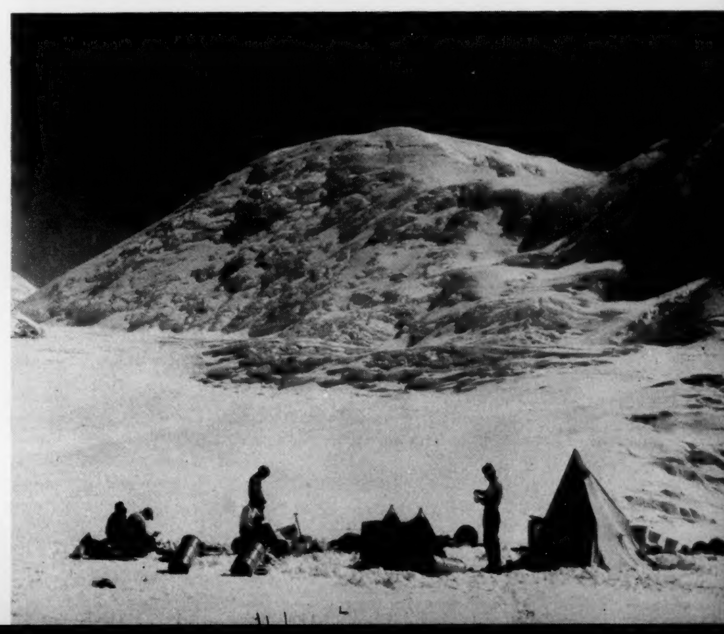
In the early days of our trip, short nights made early starts a little easier. Our first climb was to be a warm-up. Heading west from our base camp, we walked up the glacier arm toward "Icefall" Peak. The first two miles we had no need for a rope, but as we approached an icefall entering from our right, that situation changed. Crevasses were numerous, and quite well hidden by the recent snowfall. Above that icefall, another situation developed, a situation which was to dog us on all of our climbs. The recent snow was not consolidated, but was crusted just enough for the two heavyweights, Bill and Don, to plunge to their knees three steps out of four.

As we scrambled up, a scree slope bypassed a second icefall and led to an upper snow bowl. Crossing this, we reached a ridge leading to the "South Gemini," and by 4 p.m. we had churned up through the final pitch of 40 degree powder snow to the summit.

"South Gemini" was only 11,500 to 12,000 feet high, but it afforded a view of most of the Klutlan drainage. Base camp was a cluster of orange and black dots 4,000 feet below us. Craig rose a forbidding blue and white pyramid to the south, and from it, ice-clad peaks stepped up toward the east and the 15,880 foot summit of Mt. Wood.

But the hour was much later than we had planned. Fortunately, our descent was rapid, and everyone was in the sack by midnight. We gave George, our astronomer, a little surprise. Comet Cherbak-Mrkos, discovered a few days before, was quite clear on the northwest horizon. George wouldn't believe it until we came home and saw a confirmation.

*Names in quotes have been suggested but not yet accepted.



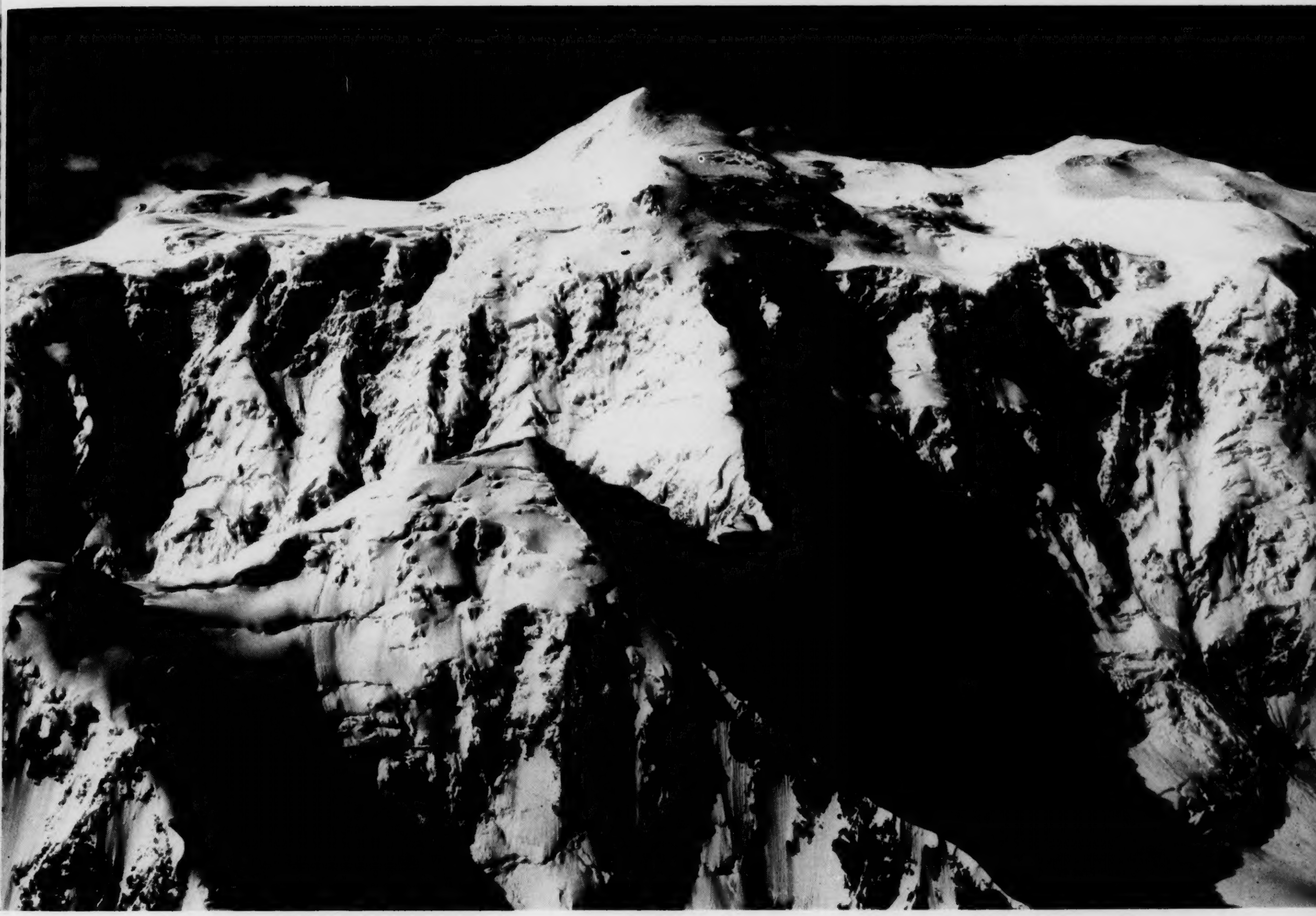
Sunday, the 11th, we moved to a high camp at the foot of the east face of Mt. Craig, and the next day we attempted the southeast ridge. But success was not to be ours. About 200 feet below the summit, Bill stepped up to an ice cliff as two of us belayed. Traversing out onto the south cornice he was able to bypass the overhanging face, but found the ridge above a steep knife edge of rime ice with about the consistency of good meringue. Traversing further on the cornice, he tried climbing an ice chimney to regain the ridge, but it just didn't go with any reasonable degree of safety. Most certainly, none of us questioned the decision to turn back.

The next day, George, Bobbie, and Bill returned to the southeast ridge and turned the other way to make the first ascent of 13,400 foot "Snowfield" Peak. They had a perfect day, with some wind, but so clear that Mts. Logan and St. Elias were like etchings. Below them and to the southwest was the unexplored and unmapped tangle of the Chitina and the Anderson Glaciers.

We made one other high camp in the Brabazon Glacier area, packing our equipment from base camp, up the east arm, to the 10,500 foot col across from the west face of Mt. Wood. Col Camp, as we called it, was established shortly after noon, leaving the rest of the day free for some scientific work. We decided to dig our first glaciological pit at this station.

A pit in the snow on a glacier exposes the accumulated layers for inspection and sampling. By exposing snow at different depths, we can look back in time — at snow that fell months or even

From a low-flying airplane, many of the glaciers in the St. Elias Range look like this, scored and pitted by the constant grind of ice and debris. (Photo by G. D. Hanna.)



years ago. Of course, this is worthwhile only if the climate is cold enough so that most of the snow that falls does not melt. Snow density, grain size, and hardness make it possible to differentiate between layers of snow that have fallen in the summer from snow that has fallen in the winter. Thus, it is possible to date layers and determine how much snow fell each year. The amount of annual accumulation is important information for glacier study.

Our test pit at Col Camp was nearly nine feet deep, exposing about three years of snow accumulation. It was easy to see the layers of large loose crystals typical of summer snow, and the fine hard-packed crystals that must have been deposited in winter. We took samples every few inches and carried these samples back to the California Institute of Technology in Pasadena. Dr. Samuel Epstein has found interesting variations in the concentration of an isotope of oxygen in the snow. These variations seem to be associated with season, altitude and sampling location. They may provide a new method of dating snow layers.

From Col Camp we climbed the NE ridge of the 13,800 foot summit we hope to name "Mt. Fermi." There was a haze layer below 12,000 feet which clouded our view of the valleys, but the great peaks, even as far as the Wrangells, were all clear. We dug another snow pit on the summit of Fermi. Here the snow showed no sign of melting periods as was to be expected at such an altitude. A most striking sight was the number of wind crusts. When wind blows across a snow surface, a hard crust is formed. These crusts can be

The snow-covered ridges and crevasses of Mount Logan stand out in stark relief against a clear, cold sky. Mount Logan is the highest mountain in Canada and the St. Elias Range, at 19,850 feet. (Photo by G. D. Hanna.)

A nine-foot-deep test pit on Mount Fermi revealed a striking formation of wind crusts, about one to the inch, indicating the mountain is no stranger to high and frequent winds.

seen in a pit by brushing the pit wall, clearing away the loose snow and making the crusts stand out. On the summit of this peak there was an average of about one wind crust for every inch of depth. Surely this summit would not have been a very comfortable place to camp.

Because of the deep soft snow we had already voted to abandon any attempt on Mt. Wood from the northwest. However, from our Col Camp, we made one final climb in the Brabazon basin. "Angeles" Peak, north of our camp, was only 12,000 feet, but the route was the most interesting knife-edge ridge of the entire trip. Again the view was breathtaking, including the look over the cornice to the Brabazon Glacier 6,000 feet below. But the weather was threatening, so we voted to move, packed up, and death-marched back to our base camp area that evening. A storm arrived that night and lasted a day and a half.

Though there were breaks in the overcast, it was still storming when we left Brabazon Plaza for the last time. We glided more than we walked, trying to cushion the jar of 70 to 90-pound loads. Moving down the Brabazon Glacier, we dumped part of our heavy loads at the 1956 base camp, and within two days, established a high camp on the divide between the Wood Glacier and the Wolf Creek Glacier. Our hope was either to reach the original 1942 ascent route on the east flank of Mt. Wood, or to spot a fast route through icefalls on the northeast face, above the divide. Time was too short, and the weather was thickening again. For consolation, that last day we climbed two 10,000 foot summits north of the divide, to look across at the far rim of the Wolfe Creek drainage, and to gaze in awe at the rock and ice of the north wall of Wood. Next morning we broke camp in a snow storm, which changed to rain as we moved down past the rubble of the 1956 base camp.

Fair weather was with us on our three-day walk to the boat. Retracing our steps down the canyon of the Brabazon Glacier, we camped the first night on the ice of the Klutlan. We hastened on game trails once more, to the tongue of the Klutlan Glacier, and our boat. What sweet perfume emanated from that first vegetation! We were back in a land of birds and leaves and flowers. The ptarmigan could laugh at us all they wanted.

The Klutlan River is born from a round hole in the ice, about 200 feet in diameter. Welling up in four-foot coffee-coloured standing waves, it plunges into the forty odd miles of continuous rapids which provided our road back to civilization.

Recovering the four drums that were airdropped near the river, we extracted and inflated our rubber raft, loaded our equipment, and shoved off from the shore of ice. Six of us were perched on the inflated doughnut of that seven-man surplus life-raft. The hump of equipment inside left no room for humans, and overloaded is a word inadequate for the situation. Fortunately, the Klutlan was full from the storms of the previous two weeks, and we shot downriver. A canoe would have swamped in a few paddle strokes, and a lumberman's pointer would not have lasted much longer.

After the first half hour we stopped and bailed out. After the second half hour and about ten miles from our starting point, the raft was full of water, we had a rip in the bottom, and we tried to stop again. Only lifejackets prevented a serious mishap as two of us were pulled back into the

The rapids of the Klutlan River were somewhat unkind to the mountaineers' rubber life-raft during the floating leg of their return trip. Here they ponder how to patch the raft's bottom before continuing on.

Right, another of the peaks which succumbed to the assaults of the mountaineers, Avalanche Peak is seen from the east branch of Brabazon Glacier. (Photos by the authors).

rapids. Strength departs very quickly in 32-degree water. Shipwreck Camp was another memorable spot, but this time we did have dry wood.

With clothes dried, and the raft patched, we headed on downriver the next afternoon. The next day, wading, dragging, and occasionally floating, the six of us forced our way through fifteen miles of gravel flats where the river splits up into numerous small interconnecting channels, and past the junction of the Klutlan with the White River. We had time to make the Alaska Highway bridge across the White River before dark, but water was coming into the raft faster than Bobby and Jim could bail it out. We were using air mattresses in the bottom of the raft as a cushion between the packs and what rocks we hit. When Jim's air mattress came floating out through the bottom, we decided it was time to stop, camp for the night, and patch it in the morning. Piles of driftwood provided the dead trees for Bud's long anticipated Bingham-roast.

Our last morning on the White River was quite uneventful except for a flock of six Dall sheep, including a magnificent ram, which stood on the high bank to see us pass. Midday, August the 28th, we pulled ashore on the sand bar just above the White River bridge. The bus company had gone bankrupt about a week earlier, but with the northern hospitality at Danny Nowlan's White River Lodge to shorten our wait, we were all able to hitchhike back to Whitehorse in time for our flight on the 31st.

What did we accomplish with all this exertion? Five of us had very presentable beards. Bill and Don lost some weight. Six summits, between 10,000 and 14,000 feet high, were visited by man for the first time. We brought back snow samples and glaciological records from a new area. We added over 1,000 color slides to our collections. But most important, we had experienced a month of companionship and teamwork in some of the finest mountains in North America.

1. *Marchantia*

2. *Lychnis*

MINIATURES

1. ***Marchantia*** **is a common Arctic liverwort. The spores are one-eighth of an inch tall.**
2. ***Lychnis*** **stands about four inches tall. The lanterns are generally about one-half inch long.**
3. ***Salix*** **has a catkin about one and one-half inches long.**
4. ***Papaver*** **has flowers approximately three-quarters of an inch in diameter while the entire plant rarely exceeds four or five inches in height.**
5. ***Androsace*** **has flowers about three-eights of an inch in diameter and the plant is about one inch tall.**
6. ***Saxifraga*** **grows to be approximately four inches tall and its flowers measure about one-half inch across.**
7. ***Ranunculus*** **seldom gets taller than two inches and its flowers are generally about one-half inch in diameter.**
8. ***Pedicularis*****, one of the tundra's most colorful plants, grows about three inches tall.**

3. *Salix*

PAINSTAKING CAMERA
WORK BY THE HANNAS
BRINGS OUT MUCH
DETAIL IN THESE
EXTREMELY
DIMINUTIVE
ARCTIC PLANTS.

ES

OF THE ARCTIC

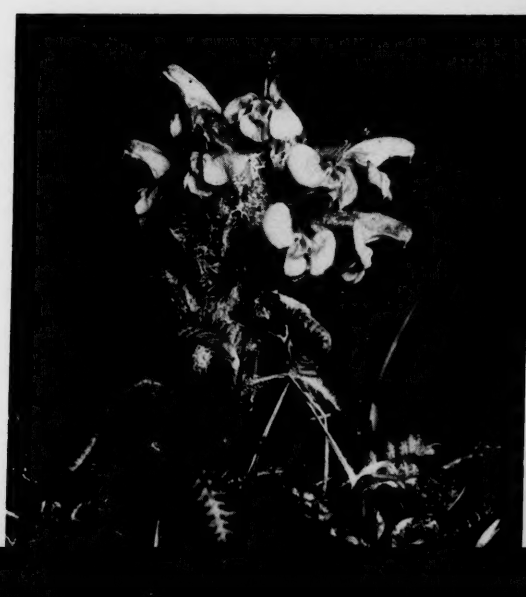
**Dr. and Mrs.
G. Dallas Hanna**

4. *Papaver*

5. *Androsace*

6. *Saxifraga*

7. *Ranunculus*



8. *Pedicularis*

AMERICA REDISCOVERS

C. F. Laseron

... an Australian opinion

AMERICA is truly a great nation, and it is granted that Americans have discovered much and done many remarkable things, but it is particularly irritating to others, including Australians, when Americans in authoritative positions lay claim to discoveries actually made by people of other nationalities many years before. This applies to Antarctica as elsewhere.

Rear Admiral George J. Dufek, commander of the United States Naval Force now operating in Antarctica, has recently published a book entitled *Operation Deepfreeze.** This book seems a natural sequel to an article in the *Saturday Evening Post* written some years ago by an American admiral, I think the same one, on International Claims in Antarctica, in which an extraordinary statement appeared to this effect: that the great bulk of Antarctic exploration in the past had been done by Americans, and they had landed and explored from the shore, whereas men of other nations had been content to examine the continent from the sea. The author apparently had never heard of Shackleton, Scott, Amundsen, Mawson, and many others.**

Now on the whole *Operation Deepfreeze* is an interesting book, and it is gathered that Admiral Dufek is a capable organizer, and a man of drive and initiative. He certainly had funds at his disposal, for 22 million dollars were appropriated for the expedition, on top of the normal naval expenditure for ships, pay, etc., and the expedition had everything in the way of mechanical equipment, aeroplanes, fuel and stores, besides a whole army of help. With all this much has been done, new lands have been discovered, and America has played a full part among many other nations in the work of International Geophysical Year. But some of the claims are fantastic.

As an example, and reflecting on Australia's own part in Antarctic expeditions, take one passage in the book and consider it. Leading up to it is an account of several long aeroplane flights from the base at McMurdo Sound, during which large areas of the Antarctic continent were covered. To quote, p. 108: "During these six flights the *unknown* [the italics are the author's] Antarctic continent had been thoroughly covered from longitude 90 degrees east to McMurdo Sound. This was the region opposite Australia. . . . The coast had been determined, by previous expeditions operating from the *seaward,* to be land or islands. Notable among these expeditions was the task group commanded by Capt. C. A. Bond, U. S. N. in 1947. . . . This land might form part of the Antarctic continent or it might be a series of islands."

Not a word, you will note, about anything previously done by other nationalities. Now Australians ought to know that this particular part of Antarctica is the same on which Sir Douglas Mawson's Expedition landed and spent two winters between 1911 and 1914. Under appalling weather conditions (for this area proved to be the windiest region in the whole of Antarctica and therefore in the world), sledging parties from the main base explored and mapped some 460 miles of coastline and penetrated inland 300 miles to the Magnetic Pole. It was also the scene of Mawson's own heroic and epic journey, when, having lost his two companions, Mertz and Ninnis, he struggled back to the hut after suffering terrible hardships. This story is told in full in the official account of the Expedition, *The Home of the Blizzard,* and later in my own shorter book, *South with Mawson.* It is good in the latter part of my life to feel that I had some part, if only a minor one, in this work, first as one of the supporting group to the South Magnetic Pole party, and then with Stillwell and Close, running a traverse and mapping in detail some 50 miles of the coast east of winter quarters.

At the same time our Western Base, under Frank Wild, had taken the then unprecedented risk of landing and wintering on a floating ice shelf, and from there had mapped and explored about 300 miles of what Admiral Dufek calls this unknown part. Since that date further expeditions by Sir Douglas Mawson, and later by a very fine French Expedition in Adelie Land, have filled in most of the gaps.

At the eastern end of the area, as long ago as 1899, a British expedition under Borchgrevinck had landed and wintered at Cape Adair, just where the coast turns southwards into the Ross Sea. On the Ross Sea side, both the Shackleton and Scott expeditions mapped in most of the coast. From the Shackleton Expedition, Professor David, Mawson, and Mackay crossed mountains which the Americans later "discovered" and penetrated to the Magnetic Pole from the east. On the Scott Expedition the plane-table survey by another Australian, now Professor Debenham, of some 200 miles of country is probably the most complete of its kind in Antrarctica. And accompanying Debenham still another Australian, Professor T. Griffith Taylor, has written what is certainly the most comprehensive monograph on Antarctic Topography as yet published.

All this region, except the strip bordering the Ross Sea, which is Queen Victoria Land, appears on American maps as Wilkes Land. This is on the grounds that it was first seen by the United States Exploring Expedition under Commander Wilkes prior to 1842. What Wilkes saw will never be known – probably a

*See Editorial and Reviews, *PD,* July-August 1957.–ED.

** Author Laseron, as nearly as the editor has been able to discover, is referring to an article "Who Owns Antarctica" by Commander W. J. Lederer and Stacy V. Jones which appeared in the *Saturday Evening Post* of December 13, 1947.–ED.

gigantic iceberg – but both the Scott Expedition and our own sailed right across the areas where he had reported land. About the same time the French explorer Dumont D'Urville really did see land, and landed on a small rocky island off the coast, which he named Adelié Land in honor of his wife.

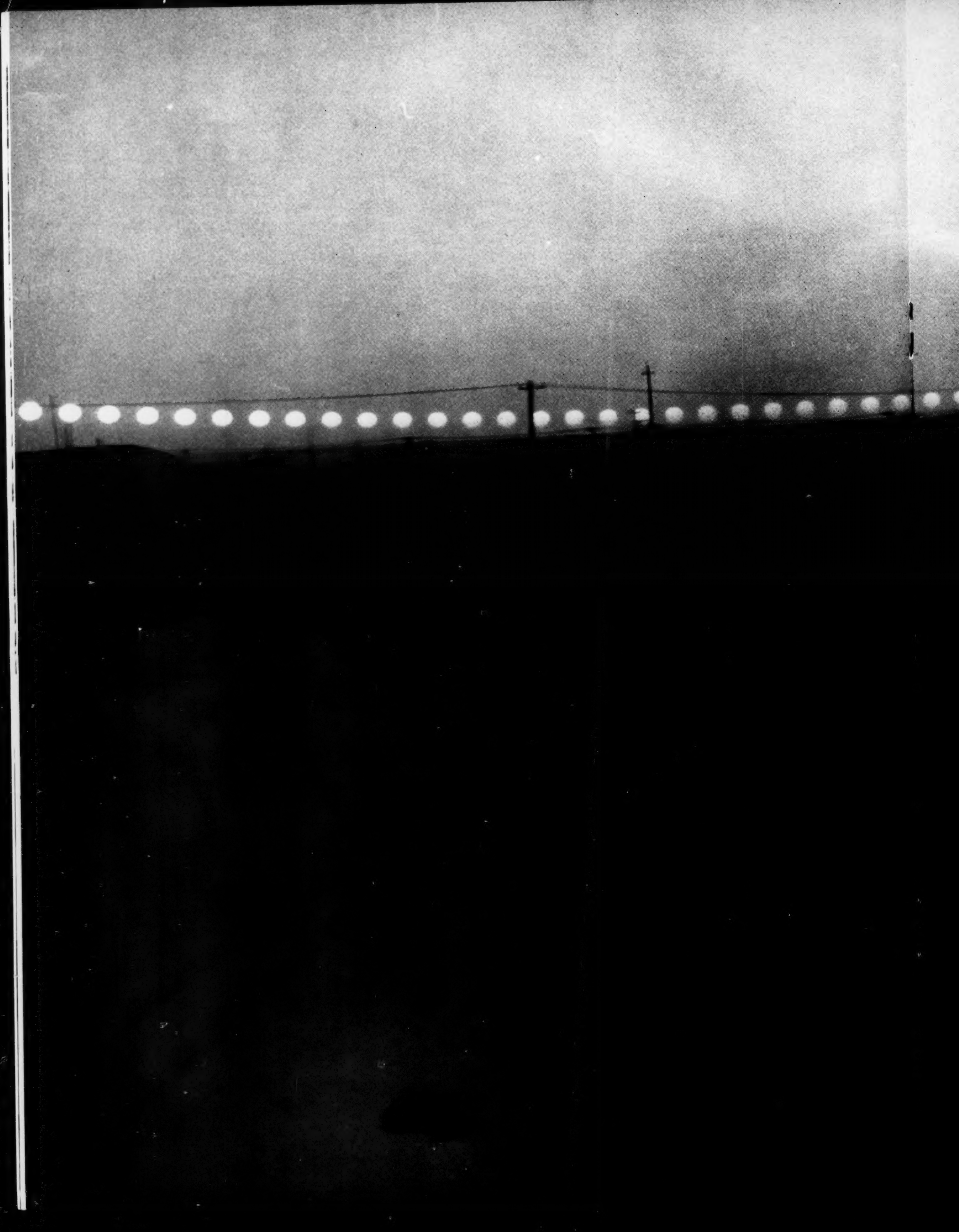
This article deals only with that part of Antarctica south of Australia, and even there does not take into account the magnificent work being done by the British Expedition under Fuchs, nor the New Zealand share in this under Hilary. Nor does space permit an account of the work done and being done by Australian and other expeditions west of this nor in that area of Antarctica south of South America called Graham Land, which the Americans on false premises label Palmer Peninsula. But it is necessary to emphasize that in what might be called the pioneering period, before the days of aeroplanes, wireless, and tractors, the foundations of Antarctic exploration were laid by several nations, among which America played a negligible part, but in which England was predominant and in which Australia, in proportion to her population and resources, is high on the list. And though Admiral Dufek proclaims Admiral Byrd as the greatest of all Antarctic explorers (as is the American habit of proclaiming world championships), I would single out Captain Cook in the 18th century, Admiral Ross in the early 19th century, and in the present century a group of men – eminent enough to dispense with first names or titles – Shackleton, Scott, Amundsen, and our own Mawson. Nevertheless, among the later explorers, a tribute must be paid to the late Admiral Richard E. Byrd, particularly for what he accomplished in the area east of the Ross Sea, in Marie Byrd Land. His achievements bring him also within the select few of truly Antarctic explorers.

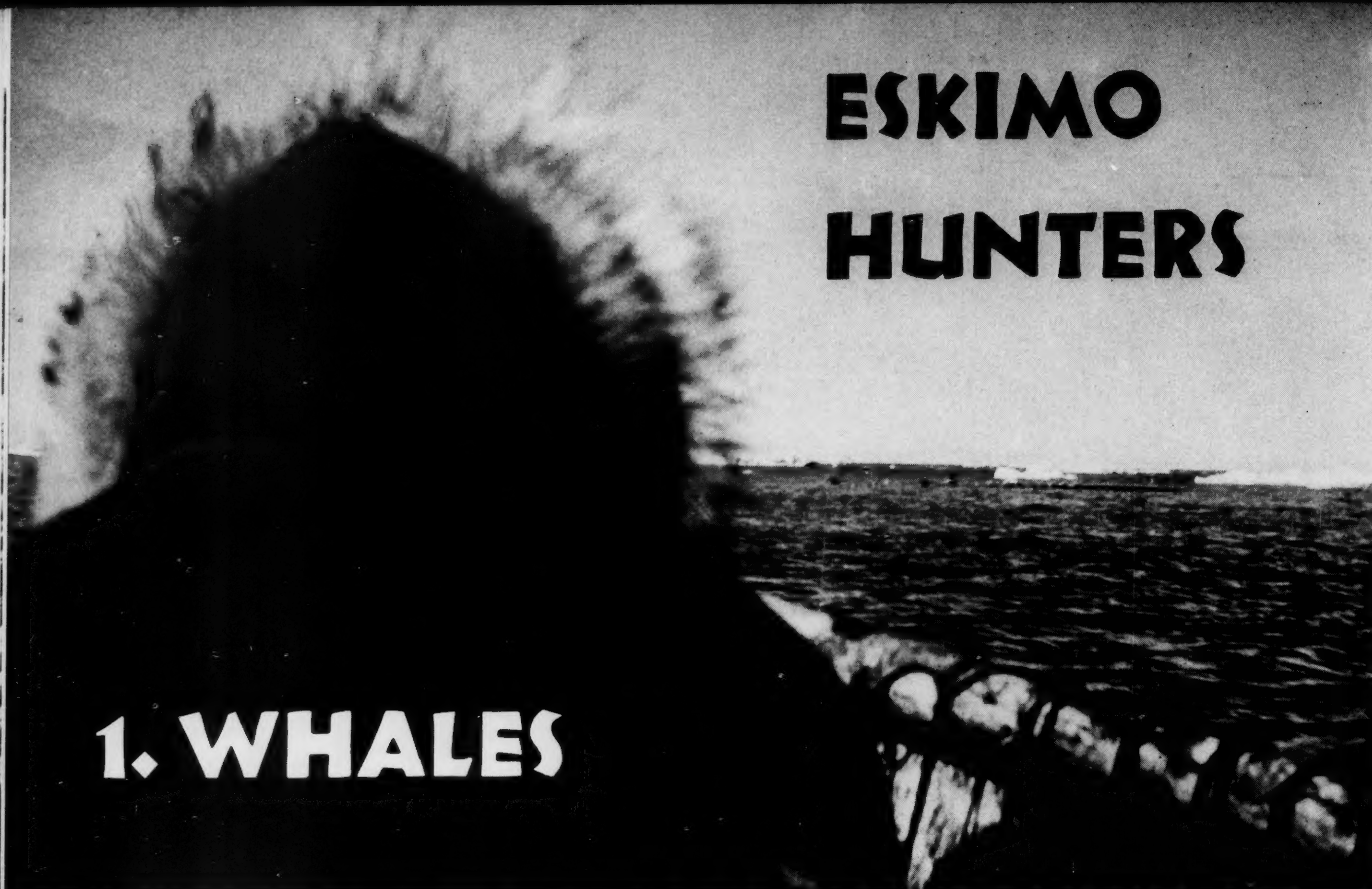
EIGHT WEEKS IN AUSTRALIA *taught me respect for many natural qualities of Australians, not the least of which is honest forthrightness. It was in Sydney's lovely Hyde Park (the proper place!) as I was having a yarn with him that C. F. Laseron, Australia's chief writer on the geological past and present of the continent* (The Face of Australia; Ancient Australia: *see Reviews,* PD, *Sept.-Oct. 1956, p. 35), with some feeling said that he had the Aussie equivalent of a "bone to pick" with some American. I replied in some U. S. version of "Good-o, mate, Oi'm yer man." What followed was not only forthright; it was a sharp reminder that Australia is closer than America is to the Antarctic, not only in physical proximity but also in that condition of nearness to heart which is kept acutely sensitive by the self-administered stimulant of hopeful sovereignty. Australians are taught that the "Australian Antarctic Territory" is an accomplished fact; while America still officially plugs for internationalization of the bottom continent. In any event, the record of Antarctic discovery and exploration is a record of accomplished fact, and one to be kept fair and straight on the books. Moreover, it is a record for all mankind to review with pride, whatever the nationalities of those men who made it. And I am sure that in the accompanying paper, for the publication of which I gladly offered* PD*'s pages in postscript to editorial and review matter of our July-August 1957 issue, Mr. Laseron speaks not so much as an Australian or even as a one-time Antarctic explorer, but primarily as any man who values fairness and truth.*

Sydney, 28 March 1958. *D.G.K.*

THE MIDNIGHT SUN: *photograph by A. R. Franzke*

(*Next two pages*) The horizon seems to have many midnight suns in this photo. Actually, photographer Franzke snapped the sun every four minutes from 10:15 p.m. to 3:25 a.m., May 12-13, 1957, from Point Barrow, Alaska. Lens setting: 1/200" at f.32. Print by Marshall Schalk.





ESKIMO HUNTERS

1. WHALES

IN THE PAST, as nearly everyone knows, the Eskimos lived almost entirely by hunting. If any adult keeps a picture of the Eskimo from his or her childhood, it is probably that of the old hunter, harpoon poised, patiently waiting behind his windbreak at the breathing hole of a seal, ready to thrust when at last that round black head floats up through the clear water.

When we spent a few summer weeks on the arctic slope of Alaska in 1956, the author was naturally curious to determine how much of this old-time hunting life remained, and to what extent it still seemed important in Eskimo economy.

In late June, we flew south from Point Barrow, Alaska, over the still-frozen sea. To our left, the dark land rose gradually from the low shore. Meandering lines of white marked the snow-choked streams in a monotonous rolling country without trees, dotted with innumerable shallow ponds, on which an occasional speck of a waterfowl could be seen. To our right, the brilliant ice stretched to the horizon, canted up by pressure into hills and ridges. Frequently, a deep blue spot marked an opening to the water below the ice and around the edges of these spots seals could be seen basking in the welcome warmth of the sun.

Below us, a doll-like figure came into sight—an Eskimo with his parka pulled well forward over his face and riding upright on the tail of his sled with his seven dogs running briskly along the trail. Then we saw two tents on a beach, a sealing camp inhabited by two active "beetles" who waved to the plane.

Presently, where the shoreline bluffs rose to unusual heights, fully 30 feet above the sea, we saw the scattered village of Wainwright. There were some houses of wood, miniature copies of the government-yellow Cape Cod schoolhouse. Many of the houses were sod, built according to an ancient plan, which were half sunk into the ground for added warmth. Along the coastal bluffs, convenient to the sea, were white tents to north and south. Pools of water lay among the houses, held in basins of perennially frozen soil. Boats were pulled up along the shore, in readiness for the time when the ice would break up. Dogs were chained in lines, secure and at some distance apart. Debris of many sorts fringed out from every

RICHARD D. TABER

An Eskimo hunter in the bow of his boat near Wainwright, Alaska, after the ice has begun to break up. When a whale surfaces out of range, the Eskimo whalers jump in these boats and go after it. At right, details of the boat's construction may be seen.

house. As we prepared to land, little figures in their parkas ran down to the bluffs along the beach.

We landed below our audience, on a narrow strip of gravel cut by creeks and flanked by a strip of open water, the shore lead. As we unloaded, with all of the villagers clustered around the plane chattering in Eskimo, a pair of Steller's eiders came flying down the lead, well offshore. At once, every man and boy who had been idly watching the mail come off the plane ran crouching to the shore, uttering gutteral, rasping croaks. The eiders turned and came sweeping down toward the calls, only to meet with a shower of stones and a wave of laughter. It soon became plain that although there may be a movie in town and the mail plane may be in, the Eskimos of Wainwright are hunters first.

The hunting year begins in April, with the northward migration of the whales along the offshore leads, usually some eight or ten miles out from the coast. Whales must breathe. Some, like grays and finbacks, just make one or two spouts as they exhale and quickly sink from sight again. Others, such as the bowhead, may fill their lungs as many as fifteen times, lying nearly motionless all the while.

To hunt these whales, organization is required. The whaling captain is a big man in the village. He has to have enough capital — about two or three hundred dollars now — to keep his crew of eight or ten men camping beside the lead and keeping watch for whales for a month, if need be.

After hauling their gear on dogsleds to the edge of the open water, a long, steaming gap in the ice running roughly north, the whalers choose a spot where a whale might blow. The Eskimos believe that whales follow one another along some underwater path and rise to breathe at the same points along the route. Where one whale has come to the surface is a good place to wait for another, the Eskimos reason.

The crew is divided into three watches. For eight hours, one watch will wait behind a wall of snow-blocks to break the wind, by the water. Drops of water, splashing up from the edge of the ice as the little waves break, freeze on the whalers' parkas as they hit. It is difficult for us to imagine this intense cold, but sometimes during the Wainwright winter, the temperature drops to 70 degrees below zero Fahrenheit, at which point kerosene, for example, has the consistency of molasses.

The gunner holds the bomb-gun, a heavy brass weapon of considerable bore, reminiscent of a signal gun. The bomb is a cylinder of brass, containing an explosive charge. The gunner must be close to the whale to place the bomb properly in

An Eskimo hunter's dog team pulls his sled and boat to wherever they may be needed. The skin boat is virtually unchanged from the ancient pattern except that it now has a flat stern to accommodate an outboard motor. In the background, Wainwright Lagoon is still frozen over.

For each whale the village whalers capture during the season, a post-season *nolikatuk* or whale dance is held, a major feature of which is the blanket-tossing.
Left, in the early evening, the party is lively and the Eskimo girls are taking their turns in the tossing.

Right, the *nolikatuk* in progress. The young man on the blanket is David Bodfish, grandson of a whaling captain. In the background are the crossed poles which support the blanket.

the back of its head or behind the shoulder, so that the bomb will miss the shoulder-blade and penetrate the chest. Shortly after the bomb is fired into the whale, it explodes, killing the whale instantly if the bomb has been well-placed. It is necessary to secure the whale as well as kill it, and here the darting-gun comes into play. The darting-gun has a stout shaft for a handle. On the end of the shaft is a socket in which sits the dart, or harpoon, of wrought iron, attached to thirty or forty fathoms of line and a sealskin float. When the dart is thrust against the whale's tough hide, the backward pressure trips a simple trigger which explodes a charge of black powder. This explosion drives the harpoon well through the whale's hide.

When the dead whale sinks to the bottom of the shallow sea, the sealskin float remains bobbing on the surface, marking the place. Then the waiting is over and the work begins. A dogsled is dispatched back over the ice to the village, where a tremendous block and tackle is taken from storage and the dogsled hurries back to the place of the kill, leaving behind the rising wave of excitement in the village that the killing of a whale always brings.

At the whaling camp, the whalers are busy pulling the whale to the edge of the ice, securing the line to its tail and then hauling away. The carcass slowly slides out on the ice, which cracks under its weight. The haulers slip and slide and joke and laugh as that little mountain of meat and blubber looms larger in the mist. Then the task becomes a gigantic job of butchering. Sled after sled slides homeward, piled high with the dripping promise of good times, and then returns empty and gliding over the ice for another load, to the carcass. Meanwhile, back in the village, the Eskimo children cluster around to hack off and munch bits of skin and blubber; the famous, delicious (to them), chewy, fruity, mouthwatering *muktuk*, or Eskimo candy.

But many times the whales don't appear. Day after day, the crews wait, scanning the lead, ready to shoot quickly if a whale blows close, or to jump into the waiting boat if the whale surfaces out of range. This is a time when wealth and prestige become most important. The established whaling captain, with last year's catch behind him and his reputation for success helping to bind his crew together, can keep on the alert for a whale, day and night, for a month. A younger man, with a small crew just big enough to man his boat, makes his camp at the lead, hangs on to the limit of his

Above, an Eskimo's sod hut with his dog on the roof. The huts are dug out underground and are generally quite warm but poorly ventilated, causing many Eskimos to prefer tents. Many of the huts have electricity from home generators.

endurance and hopes for that stroke of luck which will repay his investment many times and make him a member of the village elite, one of the whaling captains.

On the whole, young or old, the whalers have a long wait between whales. In the spring of 1956, the Eskimo whalers of Wainright took only two.

Each whale taken is celebrated, individually, in June with a whale dance, or *nolikatuk*. This is an all-day party whose host is the successful captain. On the open space which serves as the village square, his boat is set on edge to serve as a windbreak, while on a pole behind it his personal flag flutters bravely in the breeze.

Preparations for the celebration begin early. From caverns below the permafrost, the muktuk is brought out to thaw. Then a walrus-hide blanket is produced. The blanket is about twenty feet long and to its corners are attached ropes which are fastened to crossed poles which pull the ropes taut and secure. The poles hold the blanket off the ground at about chest height and, as the ropes stretch and the poles bend, the blanket becomes much like a trampoline.

As soon as the blanket is in place, the Eskimo children surround it, holding the ropes which lace the edge. One of them climbs up to take a precarious stance in the center of the blanket, while others raise and lower it, gently at first, then with ever-increasing force. Soon they chant not some ancient Eskimo rhyme but "One! Two! Three!" At that signal, the children give an extra heave and the dancer is thrown high in the air. If it is a boy, he holds his legs stiff. A girl flutters her feet in a running motion. The dancer seems to hang in the sky for a moment, and then comes down and goes up again, trying to keep his balance and stay upright for as long a time as possible. Or if the village clown is the dancer, he tries to see how many different ways he can fall and still survive.

As the day wears on — and there is no night to bring an end to the festivities at this season — the children tiredly curl up to chew their muktuk. Their places at the blanket are taken by young men in fancy parkas and chunky maidens who are heaved onto the blanket with yells and whistles. The season of whale dances is one of the social high points of the year and visitors come in by plane from neighboring villages, a hundred miles away, to share the fun which celebrates a successful whaling season for the Eskimo hunters.

Below, a hunting tent camp typical of those used by the Eskimo hunters on their hunting trips from Wainwright. In the background is the midnight sun just above the horizon. (All photos by the author.)

J. McKim Malville

Science and the FROZEN SILENCE

SCIENTISTS STUDY ANTARCTIC PHENOMENA AT ELLSWORTH STATION

FOUR GROUPS OF HOODED men clustered in the mists of falling snow about the "dead-men" frozen into the Filchner Ice Shelf anchoring our cargo ship, the U.S.S. Wyandot, to her off-loading site. For the two previous weeks, six thousand tons of strangely-shaped boxes, airplanes, weasels, and tractors had flowed inland from the ship along the two miles of road to the site of our base. But now, her holds empty and a blizzard imminent, the ship, already battered from 34 days in the pack ice, was hurriedly leaving for safer and warmer climes. At a signal from the bridge, we pulled the pins of the "dead-men," thereby cutting one by one our few remaining ties with civilization. The hawsers were pulled in, and the ship, our home and prison for three months, slowly pulled away and disappeared in the ice-bound mists to the east.

But our isolation was not yet complete; a half mile to the west along the edge of the shelf was the Wyandot's escort, the ice-breaker Staten Island. Inland on a featureless wind-swept plain of snow, our home for the next year was receiving its finishing touches in a frenzy of activity. After the departure of the Wyandot, the work continued, assisted by the crew of the Staten Island, for another sleepless 24 hours. Finally on the afternoon of Monday, February 15, 1957, the ice breaker and her crew left to rescue the Wyandot, already stopped by the pack ice just five miles to the east.

With the departure of the men and ships a wonderful, measureless quiet blew in from the reservoir of silence to the south. The eight tractors ceased their noisy rushings; the red weasels lay still and quiet, scattered about the camp; hammers and nails lay, for a time, forgotten. There was the soft hiss of snow drifting across the surface of the ice shelf and the occasional crunch of passing footsteps, but for one who had just spent three months living between the thumping, vibrating steel decks of a ship and then two weeks amidst the unceasing activity of base construction, this white, soundless cloak, enveloping the base was the most refreshing introduction imaginable to the Antarctic.

On this, our first day of isolation, we began the long slow process of discovering and recognizing every dusty corner, every leaky crack, every slamming door, every inch of our home and world for the next year. And simultaneous with this we began learning each idiosyncrasy and habit of our 38 companions that were to plague, amuse, and stimulate us throughout the following year. Home, such as it was, consisted of 19 red, pre-fabricated buildings of Ellsworth Station, one of the six American IGY bases in the Antarctic. Beneath the foundations of our buildings 2,700 feet below lay the ooze of the ocean bottom, and between us and the near-freezing waters of the Weddell Sea floated our sole security, an unpredictable and unstable sheet of ice, 800 feet thick. How far south of us the ice shelf extended before touching land we had not the slightest idea. In fact, Admiral Byrd in 1927 knew more about the country surrounding his first base in the Antarctic, Little America I, than did we for the following six months of the surrounding Filchner Ice Shelf.

What we did know of our environs did not look very encouraging. The Weddell Sea is notorious for being the birthplace of large icebergs, presumably the broken fragments of the Filchner Ice Shelf, and from several short flights in February, we had good reason to suspect that we were well on our way to becoming the first inhabited iceberg of the Weddell Sea. Just to the west of us, the ice shelf was pierced by a long narrow tension crack discovered by the Argentines in 1954 and named by them, Bahia Chica. Between us and the Argentine base, thirty miles to the east, several similar but smaller tension cracks penetrated inland from the edge of the shelf. Extending eastward from the head of Gould Bay, the surface of the shelf was broken violently by fields of crevasses, finally culminating in an ice chasm three miles wide in places and a hundred and fifty feet deep. This chasm ran south of us in

A warmly-garbed scientist becomes a stark silhouette against the dazzling whiteness of an ice cornice at the edge of Filchner Ice Shelf upon which Ellsworth Station is located. (Photo by the author.)

an east-west direction, nearly cutting off all surface travel into the interior of the continent. Since Amundsen built the first Antarctic base on an ice shelf in 1911, the inhabitants of these insecure bases have conjectured over the possibilities of becoming insular. No inhabited base has yet succumbed to the charms of the ocean, and as we were even more incapable of altering the situation than we were of affecting the weather, the subject soon became merely academic.

For the first two weeks following the hurried departure of the ships, everyone worked to complete the base before the onset of winter. Gradually we finished all the exterior construction and managed to move the seemingly endless piles of stores originally surrounding the buildings into the tunnels. After two weeks everything appeared to be under control, and we nine scientists were able to start working on our own projects.

The two ionosphere physicists began erecting their 70-foot antenna for the ionosphere sounder. The sounder itself, an impressive ton of equipment designed for measuring the electron density and height of the overhead ionosphere, had to be put into operation as soon as possible before the official start of the IGY. In addition to the ionosonde, they had to set up instruments to record the intriguing, little-known phenomenon of atmospheric whistlers. These whistlers, as implied by their name, sound similar to musical whistles of decreasing pitch and are presumably produced by electrical discharges in the atmosphere. The energy from the lightning discharges is contained by the lines of force of the earth's magnetic field and travels along these lines of force, bouncing from hemisphere to hemisphere. Near the equator this whistler-energy must travel some 10,000 miles from the surface of the earth, giving information on the density and ionization of this inaccessible region.

The meteorologists had their rawin sonde apparatus to get into operation. It is a balloon-carried transmitter capable of relaying back to earth data on the temperature, pressure, humidity, and winds of the atmosphere up to 25,000 meters. They also had all the instruments indigenous to meteorology to set upon towers and in wind screens, and a program of routine weather observations every three hours had to be initiated.

Whenever the weather was suitable, the two glaciologists headed out into the field with their transit to survey in an accurate network of stakes for the purpose of determining the relative expansion of the ice shelf. If the wind was blowing or the visibility poor, they dug several pits into the shelf to study the snow and ice layers in the walls of the pit and to measure the yearly accumulation of snow. In holes drilled down to forty feet, they inserted thermometers

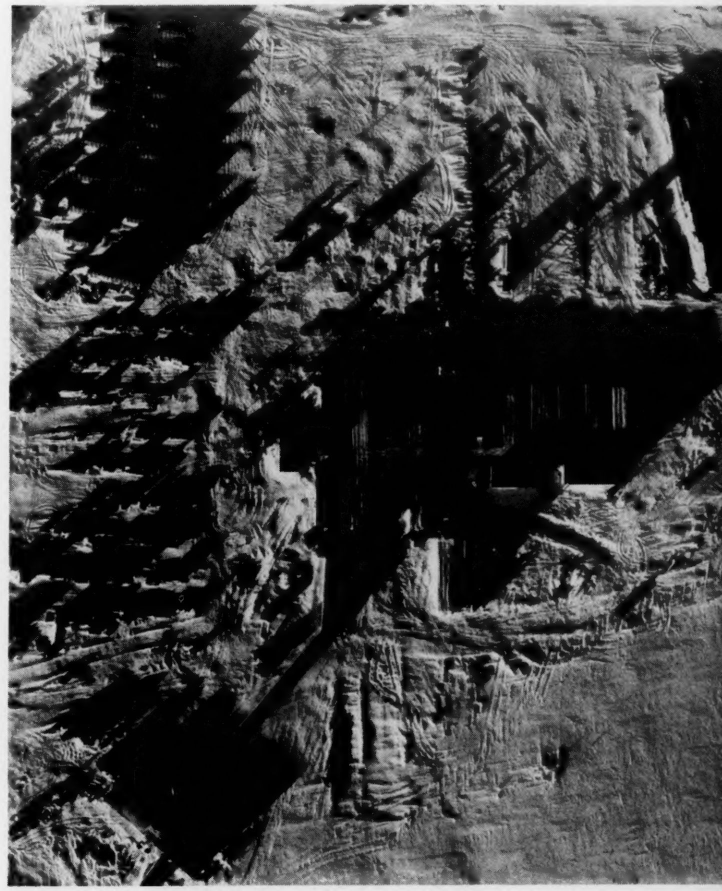
Top, the party that is to spend the winter at the Antarctic base waves farewell to the departing ship. Center, the author's "office" — the aurora tower, a snowcat and the two seismologists. (Photos by the author.) Bottom, this lunar-looking landscape is the Pensacola Mountains, 300 miles south of Ellsworth Station, as seen by the traverse party. (Photo by the U. S. Navy.)

at various depths which they read every week to measure the progression of cold waves moving downward from the surface into the interior of the ice shelf. And finally they started on their most ambitious project: the sinking of a hundred-foot-deep pit into the shelf, to enable them to study snow deposited nearly a hundred years ago.

Every morning the seismologists could be seen disappearing in their orange sno-cat in the direction of the nearby cliffs of Bahia Chica. They descended onto the bay ice by a snow ramp, crossed the tidal crack by an aluminum ladder, and man-hauled their equipment a mile out over the tumbled ice. On several occasions they were prevented from crossing the wide tidal crack, which separated the bay ice from the ice shelf, by a school of killer whales surfacing on their route. On the bay ice they set off a series of explosions to study the ocean bottom sediments by the refraction of siesmic waves. They were also able to obtain reflections off the bottom of the ice shelf enabling them to measure accurately its thickness.

And, I had a host of equipment to move up into the aurora tower, a 30-foot-high structure towering above the camp at the northern end of the science building. I was expecting the first aurora near the vernal equinox, and thus had to have my instruments — a spectrograph, an all-sky camera, and a photometer — all mounted underneath the three transparent plastic domes in the roof of the tower by that time. I also had to construct a small hut composed entirely of non-magnetic materials — some 250 feet distant from the magnetic disturbances of the base — where I planned to measure the earth's magnetic field.

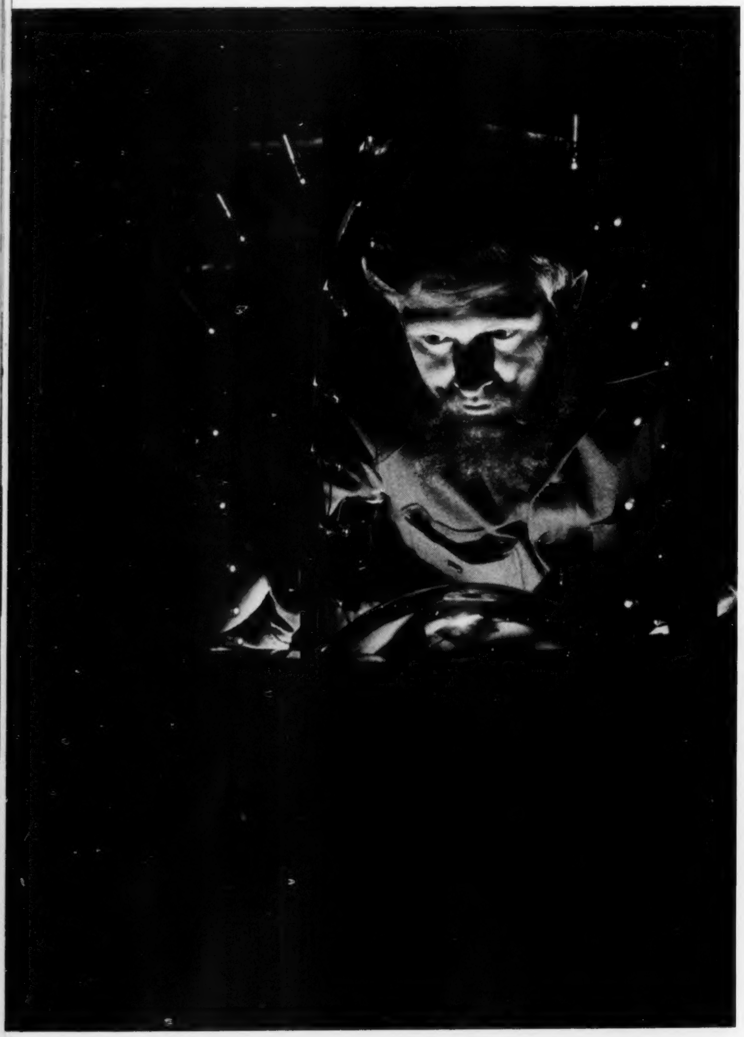
Thus passed the days of March and April as the sun became more and more reluctant to appear above the horizon and as the ever-lengthening shadow of the camp stretched further across the flat monotony of the ice shelf. The camp became more complete, and our scientific programs more routine. One sunny afternoon in the middle of March while I was working in my recently completed magnetic hut, I heard the infrequent roar of an airplane, and going outside I watched a red Otter clearly marked "British Trans-Antarctic Expedition" circle our camp and land. For the following few hours we were treated to the new faces, cheerful British accents, and friendly laughter of five members of the British expedition. We had a very pleasant dinner with them and their leader, Dr. Vivian Fuchs, discussing our mutual plans and hopes for the coming winter and spring. With two planes, five sno-cats, two dog teams, and sixteen men they hoped to achieve the nearly half-century-old dream of Sir Ernest Shackleton: the traverse of the Antarctic continent via the Pole. The vanguard of their privately-financed expedition established their base a year earlier in Duke Ernest Bay fifty miles to the east of us. Since then in numerous reconnaissance flights, they had discovered several mountain ranges and glaciers lying between the Weddell Sea and the Pole and had established a hut and a cache 250 miles inland on their proposed route. Three men were planning to spend the winter in their hut, named "South Ice" and throughout the winter we were to hear the



weekly efforts of the main base to cheer up these men in their isolation. Every Sunday morning they were broadcast — on the somewhat unique "South Ice Program" — the music and news of the Antarctic, spiced up with droll British humor and concluded with the ubiquitious "jolly good, old man, pip, pip."

With the passing of the equinox and the leave-taking of our last visitors for the next seven months, everything gradually grew into the routine which would exist throughout the winter. Day slowly drifted

Against the snow and ice, Ellsworth Station, photographed from the air, looks almost like an abstraction. (Photo by the U. S. Navy.)



Above, author Malville, complete with full beard, adjusts the all-sky camera which kept him busy during his year at the Antarctic base. (Photo by the U. S. Navy.)

Below, a series of ten photographs of the Aurora Australis taken by Malville with the all-sky camera at Ellsworth Station in June 1957. The sequence consists of 10-second exposures separated by one minute. (Photos by the author.)

into night, and time lost its meaning. We lost the sun on April 26, its setting a day delayed because of atmospheric refraction. From that day until August 17, our thoughts and lives were engulfed in the cavernous coalescence of the Antarctic night. In a land completely devoid of life and sunlight, where a foot-high snow ridge created overpowering relief, normal concepts of motion and events took on new meaning. Except for the short-lived and brilliant flashes of aurorae, the relentless wheeling of the southern stars, and the blunt buffeting of the wind, the world seemed incapable of activity and movement. Looking out at night at the monotonous ice shelf bathed in the eerie green light of the silent aurora, it seemed almost that we were witnessing the last majestic dying gasps of a universe that had reached its ultimate state – a state where time had ceased, energy had become unavailable, and entropy had reached its maximum.

But inside our buildings and tunnels under the drifting snow, our mole-like existence continued as normally as it could for thirty-nine womenless men. There was never a lack of work; the base required constant maintenance. The 30-kilowatt generators needed careful watching, the heaters required fuel, and the snow melters demanded their daily allotments of snow. Every night we had movies, and once or twice a month we gave ourselves a party complete with birthday cakes, punch, games, and prizes. Two evenings a week in the library of the science building we held informal lectures on the progress of our various scientific programs, and for three other evenings some of us retired to the base doctor's room to listen to a home-brewed music appreciation course on his high-fidelity set.

Meanwhile the scientific program produced a steady flow of data. Every fifteen minutes the ionosphere sounder would turn itself on and automatically measure the height of the ionosphere; every minute in one of the domes of the aurora tower the all-sky camera would photograph the entire visible sky; every hour a tape recorder would record the whistler activity; a constantly moving strip of film would record the swings of a magnet indicating the variations of the earth's magnetic field. Pens were inking strips of paper. Cameras were photographing data. Every breath, every nuance, every caprice of the earth and its atmosphere were observed and dutifully recorded. But in the Antarctic, where the "Fourth Law" of Thermodynamics ("everything that can go wrong,

does") appears to hold every hour of the day, it seemed that no sooner had we cajoled one instrument back into operation than another would be requiring attention.

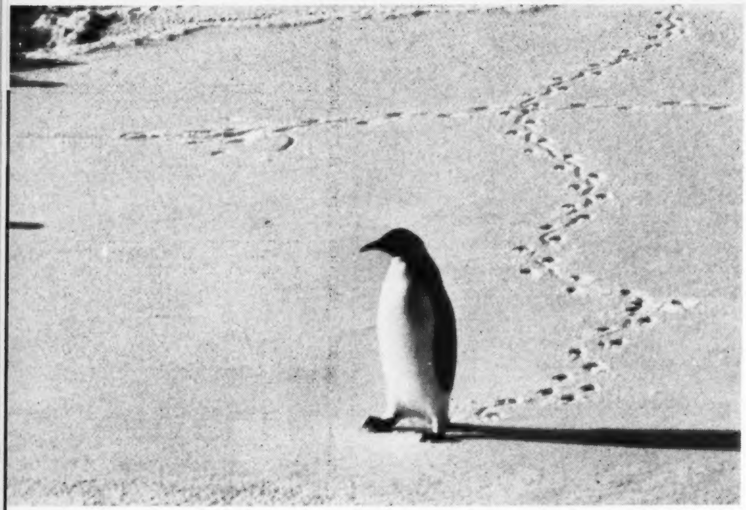
While some of us were inside developing film, maintaining the instruments, and scouring the skies for the glow of the southern lights, the five glaciologists and seismologists were busy 1500 feet east of camp digging their deep pit. For two and a half months during the winter in temperatures ranging from minus 20° to minus 50° Fahrenheit they dug deeper and deeper into the ice shelf until they seemed satisfied at a depth of thirty meters. While they were digging, they measured the density, ice crystal size, and temperature of the snow in the walls of the pit to mention only a few of the researches carried out with the assistance of the deep pit.

Always at noon, even in the middle of the winter, the northern horizon held a dim red twilight, and following midwinter's night the noon-time twilight became brighter and longer in duration. The sun finally returned on August 17, and with the rebirth of the sun, the frozen land came alive. More of us spent time outside digging out the airplanes, surveying, exploring along the edge of the shelf, or just enjoying the quiet loveliness of the sun-lit ice shelf. We had forgotten how brilliant the ice shelf became on a cloudless day with the low sun creating long black shadows across the snow ridges. All the icebergs which had filled the northern horizon during the summer and fall had disappeared and only the tumbled monotony of the sea ice remained. Whenever the southern wind would blow strongly, the sea ice would move away from the shelf leaving an open lead of black water stretching along the broken ice cliffs. Except for this occasional water, we saw only ice; the endless frozen desert to the south and the tumbled sea ice reaching and surpassing the northern horizon.

During the winter while we were living in the luxury of spacious buildings, oil heaters, and fresh frozen vegetables, working inside in a temperature 120 degrees above that outside our insulated walls, just eighty miles to the west several thousand creatures were performing their most exhausting life function completely innocent of and unaided by the artifices of civilization. In one of the nine known Emperor penguin rookeries in the Antarctic on sea ice just west of Gould Bay—in the 80 and 90 degrees of frost of mid-winter, the Emperor penguins gave birth to their young. Sometime in May and June, these incredible birds lay their single precious eggs in nearly perpetual darkness and then protected them during incubation from the freezing surface of the ice by balancing the eggs on their feet. When the chicks emerge from their eggs they undoubtedly find themselves in the most unsympathetic environment the young of any bird has to face.

We learned of this rookery during a helicopter reconnaissance flight made from the ice-breaker while we were still attempting to reach our originally-planned base site on the Bowman Peninsula. Once our aircraft were removed from the winter's snowdrifts, we were anxious to visit the breeding place of these, the most Antarctic of all birds. In November, we found the rookery, containing approximately 8,000 birds, nearly half of which were chicks; an extraordinarily lovely and fascinating place. Under the blue ice cliffs bordering the rookery, these primarily white and black birds with brilliant golden-yellow patches on the sides of their necks and a faint lemon-yellow tint to their breasts were a wonderful relief from the somber colors of the usual

The Aurora Australis during a winter night at Ellsworth Station. (Photo by N. B. Aughenbaugh.)

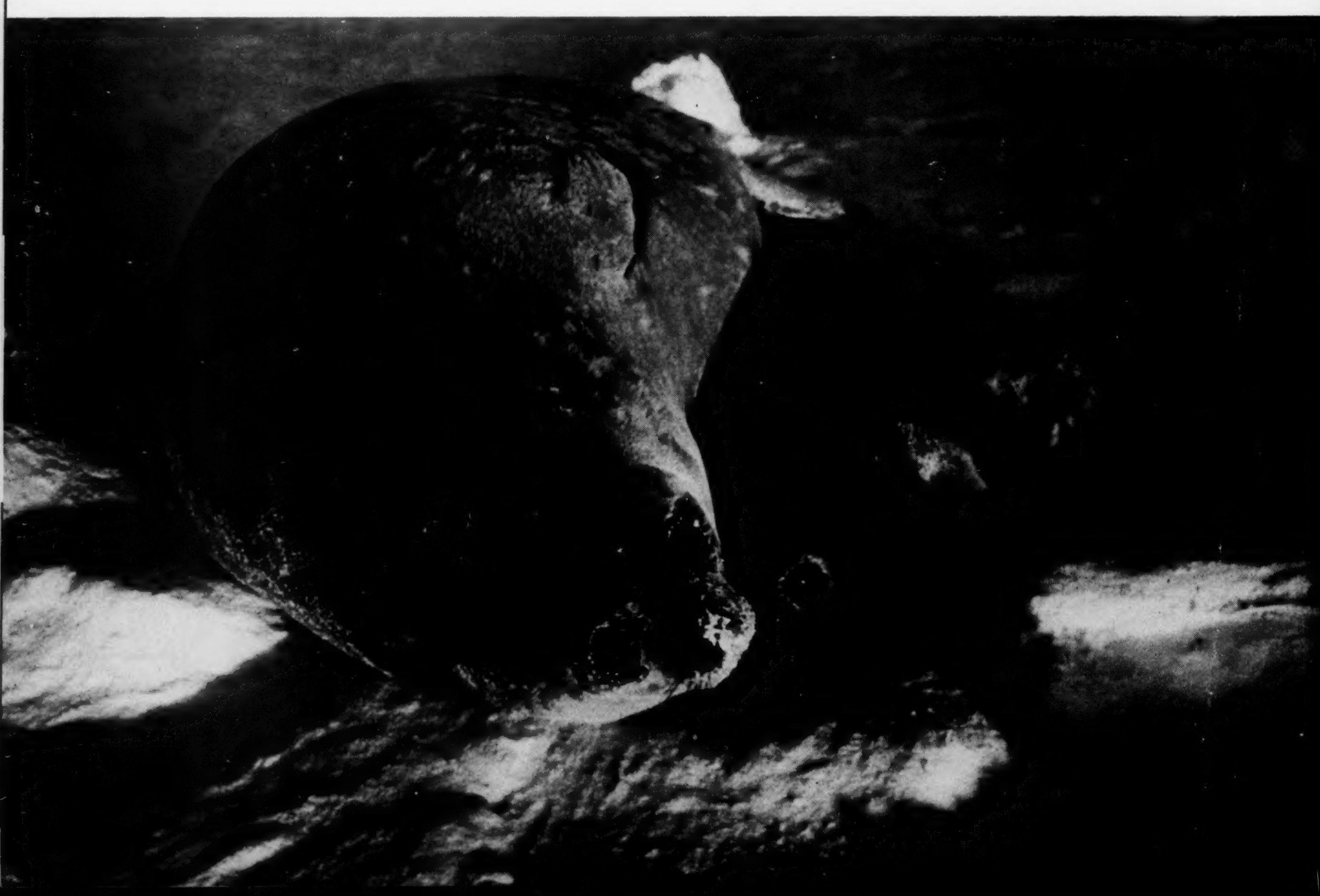


Above, a solitary Emperor penguin walks a crooked line in the pack ice near the station. (Photo by the U. S. Navy.)

Antarctic landscape. The 4,000 chicks were either jealously guarded by their parents or were left in what appeared to be a nursery while the parents were afield collecting food. When we visited the rookery, the adult birds had a march of at least several miles before reaching any open water to the north. We frequently stumbled across evidence of the ravages of winter: frozen eggs lying alone and forgotten in snow drifts, and dead chicks frozen sometimes into grotesque shapes.

In addition to the flights to the rookery, we visited occasionally the two neighboring human habitations, the Argentine base, General Belgrano, and the British base, Shackleton. We were also visited twice again by members of the British Trans-Antarctic Expedition, for most of us the first new faces in seven months. They visited in October just when their advance party was starting out to find a safe route from Shackleton to South Ice, and in November the members of the successful advance party stopped on their way back to the main base. From our flights and from the reports of Dr. Fuchs we were gradually able to piece together the surrounding geography. When we arrived, we built our base in a land almost entirely unmapped and unknown, and we subsequently had the exciting opportunity of filling in several of the blank areas of the map of the Antarctic continent.

At the end of October, our traverse party of five men and two sno-cats – both of which pull sleds loaded with two and a half tons of food and equipment – headed southward. To avoid the impassable chasm south of the base, they were forced to make a hundred mile detour to the east. In the following two months, they covered 1,250 miles of the Filchner Ice Shelf south and west of the base. Every five miles of their journey they stopped to measure snow compaction, gravity, and terrestrial magnetics, and every 25 miles they stopped for a day to carry out a full



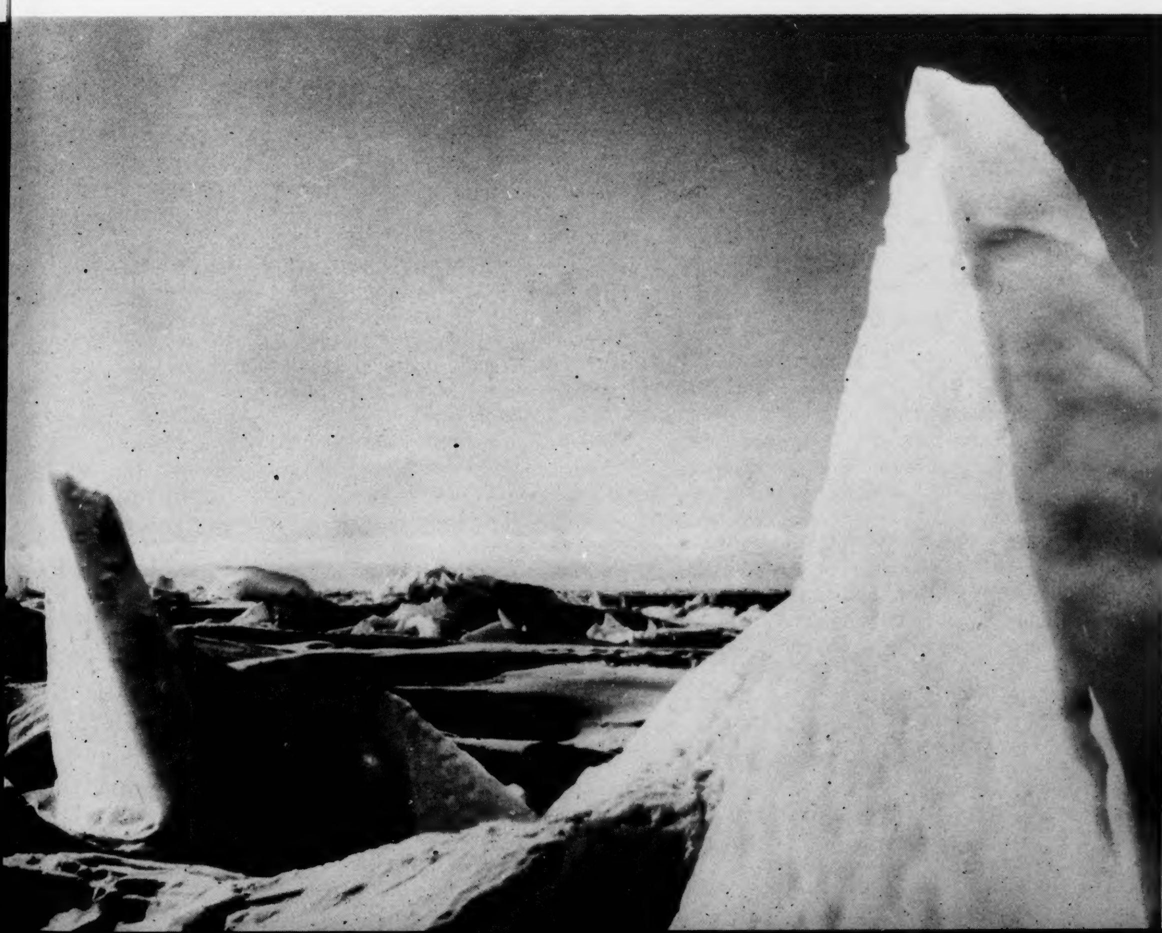
program of glaciology and seismology. The traverse party studied the geology of the newly-discovered mountains 300 miles south of the base, discovered geographical features such as islands and troughs submerged in the ice shelf, and made important studies of the snow budget of the Filchner Ice Shelf.

With the arrival of summer and of temperatures up to 32 degrees Fahrenheit, sporadic bits of life began to appear on the fringes of the ice shelf. In October and November, several nine-foot-long Weddell seals came ashore near the Bahia Chica tidal crack and gave birth to their pups. Frequently, when we climbed among the ice ridges of the bay ice, we encountered frost-encrusted, patient mother seals swollen with milk accompanied by black, wide-eyed pups sorrowfully mewing their desires for milk. These pups, weighing about sixty pounds at birth, continue suckling for the next six weeks during which they gain an average of thirty pounds a week. After the first two weeks, the mother, with the aid of a number of strategems, coaxes the pup into the water for its first swimming lesson. At an average of fifty days after birth, the mother and pup separate permanently to forage for themselves. In general, life in our portion of the Antarctic continent seemed unusually scarce; in addition to the Weddell seals we saw only snow petrels, Antarctic petrels, leopard seals, Emperor and Adelie penguins, and killer whales.

Our first contact with the outside world after ten months of isolation was via two Air Force C-47s which flew from Punta Arenas and reached us the first week of December. Their flight was the first one into the American sector of the Antarctic, and was for the purpose of testing a new technique of radio-controlled aerial mapping. Even more welcome than the ten new faces accompanying the planes were the letters they carried, not only for us but for the members of the British expedition.

The last month of our stay in the Antarctic was spent preparing our data for shipment back to the United States, writing reports, and continuing work on our normal projects. The days were often windless and the temperature near freezing, and we spent many evenings skiing along the edge of the shelf. Because of the common low temperatures and high winds, the beauties of the Antarctic are somewhat inaccessible and only infrequently enjoyed, but in the warm days of December we at last became fully acquainted with our surrounding ice shelf and were thankful to be in the Antarctic.

Finally on January 9, the long-awaited ships arrived carrying new faces — our replacements — and, of course, more mail. One month later, after spending several days enjoying the civilization of Buenos Aires and Rio de Janeiro, we flew home loaded with memories, exposed film, diaries, and data.



Far left, a mother Weddell seal lies on the ice with her two-week-old pup. The seals are among the few animals to be seen in the Antarctic. Left, pressure causes the sea ice to assume weird postures near Ellsworth. (Photos by the author.)

ASTRONOMY

ASTRONOMY IN THE IGY

FROM ITS TITLE, the "International Geophysical Year" is obviously a period of time dedicated to a study of the earth. The astronomer considers the earth as an astronomical body, so it is also obvious that the astronomer will take a great deal of interest in the IGY program. While there are many programs of the IGY which do not fall into the domain of the astronomer such as geology, oceanography, and meteorology, even here some overlapping interests appear. The physical distribution of water and particularly of ice and snow influences the astronomical movements of the earth. And many astronomical observations being made during this period are of great interest to the meteorologist.

Several programs under full operation now are gathering information regarding the influence of the sun upon the earth as concerns both radiation and particle bombardment. The sun is constantly sending out high energy radiations such as X-rays, far ultra violet rays, and gamma rays which are responsible for the formation of the ionized layers – high in the earth's atmosphere – which reflect radio waves. If these layers did not exist, ordinary radio broadcasts could not be received unless the station were within sight of the receiver. The ionized layers of the atmosphere form a "radio mirror" over the earth so that signals can travel halfway around the earth by multiple reflections between the earth's surface and these upper layers.

Often sudden changes are noted in the "solidity" of these ionic layers, and changes are found to correlate with activity on the sun in the form of sunspots and flares, (sudden outbursts of luminosity usually in the vicinity of a sunspot).

The same sort of solar activity is found to be associated with auroral displays and magnetic activity upon the earth. This arises not from radiation, (light, X-rays, etc.) but from emission of streams of particles from sunspot areas. These particles are accelerated to speeds which carry them nearly a hundred million miles from the sun to the earth in about 24 hours. Analysis of the light of the aurora reveals something of the nature of these particles. An example is the appearance of light because of hydrogen – a gas very rare in the earth's atmosphere – indicating that some of the particles from the sun must be "protons," fragments of hydrogen atoms. But some aurorae show none of the hydrogen light, indicating that some other particle is responsible.

Aurora patrols are on the job during all the dark hours at high latitudes in both the northern and southern parts of the world. Part of the IGY program involves the photography of the aurorae at one minute intervals as far as possible during the entire 18-month period of the IGY.

This is not an isolated effort. Simultaneous studies of the sun using light of all possible wave lengths, and studies of radio emission from the sun will make possible a comparison of solar activity with the auroral and magnetic changes upon the earth. It is not enough to say that sunspots cause aurorae and magnetic storms. Correlation of specific events upon the sun with specific events on the earth has never been very satisfactory. It is hoped that the IGY program will make such correlation possible.

The IGY, which grew out of a previous "International *Solar* Year," was set to coincide with a time of maximum sunspot activity. The maxima occur at approximate 11-year intervals. The current period in 1957-58 has proven to be one of the highest maxima in history.

There are two eclipses of the sun which are of considerable interest to researchers during the IGY. One, on October 23, 1957, was an eclipse in which the moon's shadow just missed the earth over the Antarctic continent. For the first time in history there were a great many stations on the Antarctic continent for the measurement of the effects of the eclipse upon the upper atmosphere. Another eclipse, October 12, 1958, will be a total eclipse of over four minutes duration. This is longer than average; however, the longest period of totality for any eclipse is about seven minutes. Several parties of astronomers will travel to the South Pacific from the United States, Russia, Japan and other nations for the observation of a multitude of aspects of the eclipse.

One unfortunate thing about this eclipse is that the path lies almost entirely over the waters of the Pacific Ocean, touching only a few islands and ending at sunset on the west coast of South America. This situation requires a concentration of observers at a very few stations along the path. Astronomers like to spread out their observing sites along the eclipse path whenever possible in order to prevent failure of too many expeditions due to local weather conditions. Some gamble is always involved in the planning of an expedition to an eclipse site, for nature is quite impartial in dispatching its cloudy skies and occasionally chooses to cover the sky just on the day of the eclipse.

The California Academy of Sciences – U. S. Naval Radiological Defense Laboratory expedition which traveled to Sweden to observe the eclipse of the sun in 1954 encountered clouds which made satisfactory observations impossible. The same two institutions are sending a party to make similar observations during the eclipse in October of 1958. Preparations for this expedition are now underway in the Academy's instrument shop.

The Academy-Navy party will join parties from several other institutions and agencies under the ad-

ministration of the Solar Panel for the IGY, whose director is Dr. Walter Orr Roberts of the High Altitude Observatory in Colorado. This group, consisting of about thirty scientists, will be transported and supported by the U. S. Navy under the auspices of the U. S. Naval Research Laboratory. The site chosen for operations is the island of Motu Koe, Danger Islands, in the Northern Cooks, 11 degrees south of the Equator. This island lies within nine miles of the center line of the eclipse path. It is under the joint protectorate of the U. S. and New Zealand.

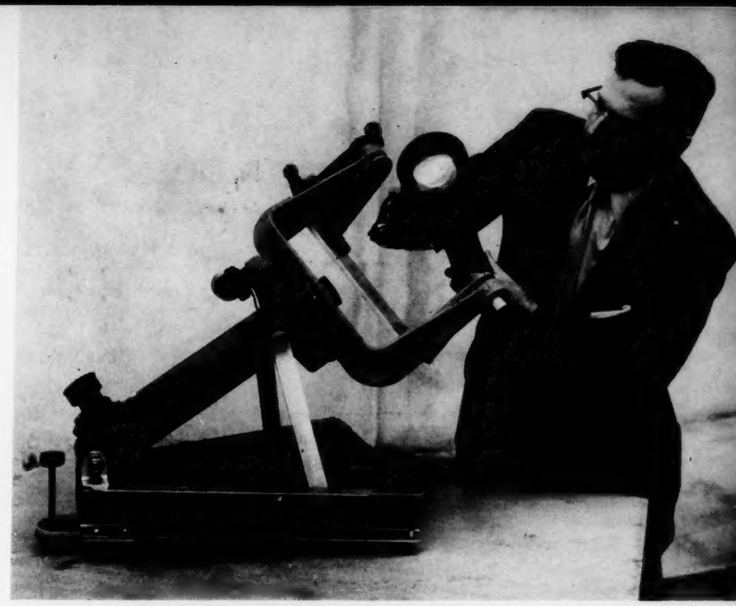
Only a brief statement of the purposes of the Academy group will be given here, reserving a fuller treatment of the project for a later issue. Our project is twofold; one involves observations during the few seconds just prior to and just after totality, and the other involves the period during totality. Thus the two programs are quite compatible.

The first project is the continuation of the problem from the 1954 eclipse which is the measurement of the direction, speed, and intensity of the "shadow bands" using photosensitive electronic equipment. "Shadow bands" are rather uncertain bands of alternate light and dark areas that are often seen to go skittering across the ground at the periods when the sun is all but completely covered by the moon. The cause is believed to be the irregular pressure zones in the upper atmosphere arising from high altitude winds. This project then becomes one of more meteorological significance than astronomical.

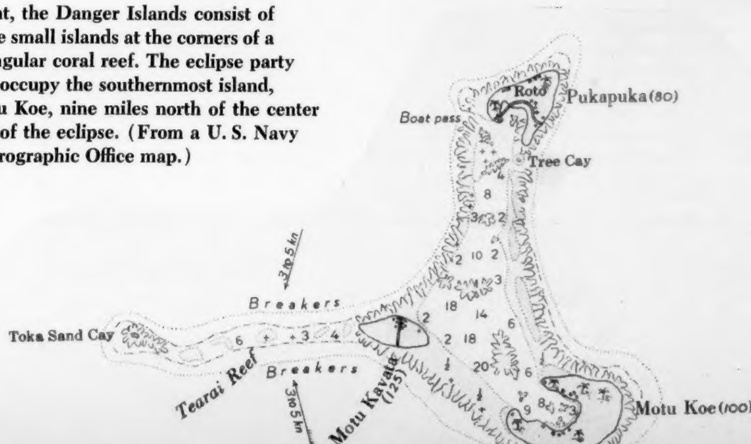
The second project will be that of the photography of the solar corona with a specially-designed camera in which polarized light is used. Polarized light is simply light in which the light waves are all vibrating in the same direction. Much of the light from the corona is polarized. This project will add data to that now existing regarding this phenomenon.

To this extent the California Academy of Sciences is participating directly in the IGY. Indirectly, the Academy has assisted in the IGY program in a number of ways. In the astronomical field it has been mainly in cooperation with the "Moonwatch" team from the local San Francisco Astronomers Association in providing a location on the roof of the Science Hall for observation of the passages of artificial satellites.

G.W.B.



Top, the author holds the camera lens in place in the specially-built eclipse camera mounting. The mounting was designed in the Academy's instrument shop so that it may be used for other purposes after the eclipse. (C.A.S. photo.) Bottom, Academy instrument maker Fred Lehmann with an aluminum stake to which is attached one of the photosensitive units designed to detect the fluctuations in the light producing the "shadow bands." (C.A.S. photo.)



Right, the Danger Islands consist of three small islands at the corners of a triangular coral reef. The eclipse party will occupy the southernmost island, Motu Koe, nine miles north of the center line of the eclipse. (From a U. S. Navy Hydrographic Office map.)

SKY DIARY

May, June, 1958

(Pacific DAYLIGHT SAVING Time used throughout)

Phases of the Moon

Full Moon	May	3	5:23 A.M.
Last Quarter		10	7:37 A.M.
New Moon		18	12:00 NOON
First Quarter		25	9:38 P.M.
Full Moon	June	1	1:55 P.M.
Last Quarter		8	11:59 P.M.
New Moon		17	12:59 A.M.
First Quarter		24	2:44 A.M.

Eclipses

May 3—**Partial Eclipse of the Moon:** Moon enters umbra at 5:00 A.M.; middle of eclipse at 5:13 A.M.; moon leaves umbra at 5:26 A.M.; moon sets at San Francisco at 6:12 A.M.

The Planets

Mercury: May 14, greatest western elongation; visible in the morning twilight for about a week around this date; mag. (+0.8).

June 18, superior conjunction.

Venus: Continues to be visible in the morning sky, rising about two hours before sunrise; mag. (−3.5).

Earth: June 21, summer begins at 2:57 P.M.

Mars: Visible above eastern horizon. **May 1,** rises at 3:30 A.M.;

June 30, rises at 1:30 A.M.; during May and June passing through Capricornus and Aquarius; mag. (+0.5).

Jupiter: Visible throughout the night during early part of May;

June 1, sets at 3:30 A.M.; **19,** north of Spica. mag. (−1.8); **30,** sets about 1:30 A.M.

Saturn: May 1, rises about 11:20 P.M., north of the tail of Scorpius; **June 13,** in opposition (mag. +0.3) rising at sunset and visible throughout the night. C.F.H.

From the astronomer's bookshelf

Rocket. By Sir Philip Jourbert de la Ferté. Philosophical Library, New York. 1957. 166 pp., 22 halftones, 2 appendices. $6.

In the midst of the current excitement over the "birth of the rocket age" a book published under the title of *Rocket* is likely to be passed up as "just another book on rocketry." This one proves to be entirely out of the category of rockets and space travel in spite of its title. Only in the last chapter does the author mention the use of rockets for space travel, and there only with great conservatism.

The author is Air Chief Marshal in Great Britain. His book is a history, from a military viewpoint, of the development and application of the V-1 and V-2 weapons by the Germans. The exciting story of the allied intelligence campaign and subsequent attacks against the factories and launching sites for these weapons is told by a man who had an active part in it.

Against a backdrop of the ugliness of war and the deadly potentialities of the V weapons, the author sets up a drama of the future which involves the political and economic policies of the great nations of the world. The relative unimportance of the smaller nations and the dangers lurking in their recognition as equal nations is one of the points proposed by the author. He even ventures onto the thin ice of population control through birth control. The last few chapters contain several rather shocking ideas, but the result is decidedly stimulating G.W.B.

Constructing an Astronomical Telescope. By G. Matthewson. Philosophical Library, New York. 1957. 100 pp., 1 photograph, 55 diagrams, index. $3.00.

This is a delightful introduction for the beginner in the art of building an astronomical reflecting-type telescope.

Sufficiently encompassing for the novice, it clearly and concisely outlines the stages of telescope construction from the initial grinding through polishing, testing, figuring, parabolizing, and the final mounting. The diagrams and illustration are clear, including a nice series on types of telescope mountings that should inspire the amateur to work out some original variations of his own.

The author, an accountant by profession, has made a number of successful telescopes up to 12 inches in diameter; this should serve as an encouragement to the person who has wanted to build a telescope, but thought the task too formidable. As the author points out in the preface: "This short work is written primarily for the benefit of those interested in astronomy who wish to possess an instrument capable of extending their exploration of the universe without involving a large capital outlay.

"A secondary object is to introduce to those seeking a hobby demanding patience and extreme accuracy, the fascinating art of telescope-mirror making." C.F.H.

The North and South

Birthplace of the Winds. By Ted Bank II. Thomas Y. Crowell Company, New York. 1956. 273 pp. $4.50.

Birthplace of the Winds has to do with a young explorer searching for information about the Aleutian Islands and the Aleuts who inhabit them. What the end result of this search is, the reader is never informed because the author strays into the realm of adventure novel instead of reporting his findings. It is an exciting field and the reader deserves more factual information than is given him.

The reports of the search for mummy caves aboard a U. S. Army power barge are exciting as are the sketchy reports of some of Bank's findings; however, it is difficult for the reader to share the author's sense of accomplishment because what he accomplished is never succinctly reported. The author does show the sad neglect of the Aleuts by our government rather reminiscent of our neglect of the Eskimos. In fact, the author obviously has a strong feeling for these people and it is a pity he didn't include more information about them. Perhaps the author should have separated his book into two accounts, the present social complex of the Aleuts, and the anthropological findings from his discovered caves.

The primary objection to Bank's book is that the appetite is keenly whetted but never satisfied. The book reads well, overlooking some rather obvious flaws of a first-published effort. Bank does bring his subject alive and he is certain to create curiosity about the subject in any who may read his account. The book is worthwhile if only to inform us of the sad state of the Aleuts and what our socio-sociological pressure is doing to them. H.W.N.

Antarctic Hazard. By W. Ross Cockrill. Philosophical Library, Inc., New York. 1957. 319 pp., 21 photos. $4.75.

Author Cockrill was a Civil Service veterinarian in Wales when, on an impulse, he accepted an invitation to apply as veterinarian with a whaling expedition to the Antarctic. His application, to his surprise, was accepted and he joined the expedition in the dual capacity of veterinarian and whale fishery inspector. At the same time, he donned another capacity, that of an extremely good writer.

Antarctic Hazard is different than many books about whaling in that its author sees through the aura of romance

commonly associated with whaling. His book, while respectful of the whalers and the industry, doesn't approach whaling with the great awe and mystery so many writers envelop their whaling stories with.

There is nothing humane about whaling, a fact which Cockrill brings out repeatedly and clearly, so clearly his book is definitely not for the squeamish. It becomes difficult, presuming the author is not exaggerating, to imagine enough good being gained from whaling to justify the cruelty. At any rate, Cockrill sets it all down.

In addition, he includes much information on how the whale, once it is killed, is flensed and processed through the factory to become whale oil, meat meal and other byproducts. In his two capacities, he was interested in finding out how whale meat could best be handled to make it most palatable for human consumption, and secondly, if the whales might have diseases which could be transmitted to man.

While telling in detail of the unpleasant aspects of whaling, the author also conveys the excitement and lure which brings the whalers back to the industry season after season.

G.B.B.

Spring on an Arctic Island. By Katharine Scherman. Little, Brown and Company, Boston. 1956. vi + 320 pp. $5.00.

Six weeks on an island 450 miles north of the Arctic Circle can be a short time or a long time, depending on the point of view of those whose time it is. Katharine Scherman, a Manhattan editor and journalist, went with a scientific expedition of eight Americans to Bylot Island. Her account of the expedition's six-week stay during the Arctic spring indicates the time was quite short to her; she obviously enjoyed the stay thoroughly. To the reader, the time the book covers may seem appreciably longer.

The author, who is also an amateur ornithologist, set out to write a non-technical book about the flowering of spring in the Arctic. To accomplish this, she has taken a highly personal approach; an approach which makes much of her book both readable and fascinating and some of it appear to be obvious padding.

Miss Scherman is obviously gifted with keen observational powers. In the portions of her book where she puts them to use, they serve her very well. In other sections, however, she writes, at length, about what the expedition ate for practically every meal, of the details of housekeeping, of the quantities of coffee and tea that were consumed and of other details which could have easily been omitted.

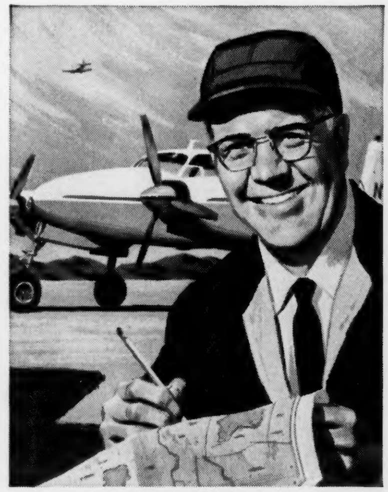
Miss Scherman obviously has convinced herself the Eskimos are childlike, so childlike they are, it would seem, simple, innocent children impersonating adults. It makes charming reading, but it is inconceivable that a people consisting of simple, innocent children could stand up to, even best, the terrific hardships of the Arctic regions as the Eskimos do, day after day, year after year.

Aside from these touches, however, the fascinating information and kindly descriptions of the Eskimos are among the best features of the book. Even better are Miss Scherman's evocative and well-handled descriptions of the activities of the birds and animals of the Arctic regions; her explanation of the tremendous importance of the tiny and ubiquitous lemmings is especially appealing. Sixteen excellent photographs illustrate various events described by the author; this reviewer wishes there had been more photographs and less unimportant detail. G.B.B.

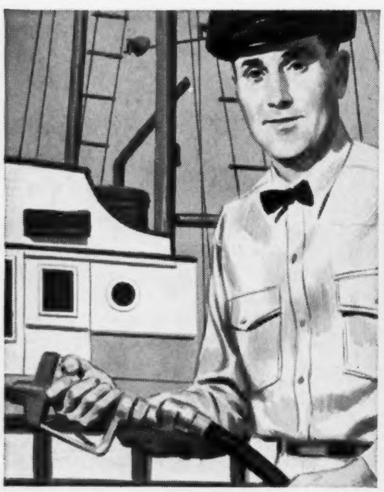
11,028 independent businessmen like these serve you better with Standard's help

Wholesale distributor Bob Evans, Mesa, Arizona, uses a plant provided and maintained by Standard. We help Bob develop new business and back him with engineering assistance on his customers' lubrication problems.

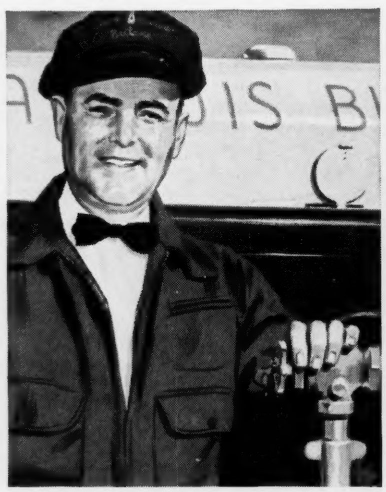
Robert "Bob" A. Juner, San Francisco, operates his own service station. We supply him with business forms, maps, lube guides and major equipment. Bob makes good use of Standard's training programs to improve his service to you.



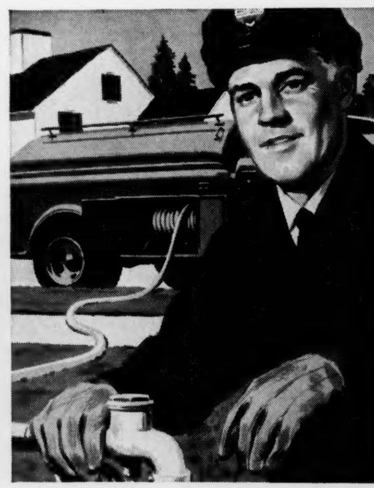
Standard's special Aviation Division helps airport dealers like Frank Kelsey, Salt Lake City, Utah, with wind direction indicators, flight guides and credit card service . . . all welcome conveniences to his customers.



Standard credit cards make it possible for independent marine dealers like Joe Faires, Port Angeles, Wash., to honor charge accounts. When fuel and lubrication problems arise, his customers can rely on help from Standard's engineers.



Liquefied Petroleum Gas dealers like Louis Marx, Atascadero, California, find our operations manual helpful in almost every phase of his business . . . especially when it comes to saving customers time and trouble on deliveries.



Keith L. Tweedie, Salem, Oregon, is a heating oil distributor. Our complete program shows him how to set up an accounting system, handle credit, cut operating expenses and give you the cleanest, most convenient service possible.

"Big Business" creates opportunities for "small business." With each doing the job for which it is best qualified, both are able to operate more efficiently . . . give you better service. Here's how it works with us.

Standard research and manufacturing skill assure quality products. In turn 11,028 distributors of Standard products, represented by these six Western independent businessmen, help bring you these products in the U. S., Alaska, Hawaii, B. C. and many other parts of the Western Hemisphere.

Because these independent businessmen perform an important service for us, we assist their efforts with technical help, suggested operations procedures, advertising and merchandising support. Thus by helping them to help themselves, we are *both* able to serve you better.

STANDARD OIL COMPANY OF CALIFORNIA *plans ahead to serve you better*